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Pre-Feasibility Report

Shawville Arena, Municipality of Shawville

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ENGINEERS · ARCHITECTS · PLANNERS

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1.0 Introduction

This Pre-Feasibility Report has been prepared for the Municipality of Shawville (Municipality) to provide a multidisciplinary analysis of the retrofit/upgrade option complete with existing infrastructure for the Shawville Arena.

It is understood that the arena is owned by a farming cooperative and that the Municipality operates it in exchange for community access. Given the age of the infrastructure, the Municipality has identified that the operational costs are high. Issues with the refrigeration system has also been identified and is scheduled for replacement. As-constructed information was requested at the start of the project, however, no previous records were found for the arena. JLR subsequently performed a limited building condition assessment (BCA) with the objective to identify important building elements, their conditions, and estimate services life to help guide a pre-feasibility report. In addition to the review a point cloud scan was performed to help prepare as-found drawings of the facility. Drawings were subsequently prepared and have been attached to this report.

JLR met with the Municipality following the BCA to establish objectives with the renovation. This report includes a description of the scope breakdown for the anticipated structural, civil, landscape, architectural, mechanical, and electrical services recommended or required to facilitate the retrofit/upgrade as well as class D opinion of probable cost estimate for the proposed work. The objective of the report is to provide recommendations to bring the building to meet minimum code requirements and standard design practices. No appetite was given to improve systems above minimum code and industry standards was given by the Municipality.

The previously performed limited building condition assessment will serve as the basis to help define systems and recommended improvements as part of the proposed renovation. Each major building engineering discipline (structural, architectural, civil, mechanical and electrical) conducted a visual review of the arena and documented key observations of each asset to better understand the building systems, surrounding environment, and major equipment within the building. The building systems are described in the report and include high-level feedback on observed deficiencies, anticipated remaining service life and suitability for possible upgrade or overhaul versus wholesale replacement. This helps to define the scope of the renovation. It is recommended that this report be read in conjunction with the Limited Building Condition Assessment and Summary of Systems, prepared by J.L. Richards & Associates Limited and dated November 2024.

Given the lack of as-constructed information, a point cloud scan was used to develop base plan drawings to perform architectural code review for accessibility requirements and help inform quantities for cost estimates. The Level 1 base plan can be seen in Figure 1. It should be noted that due to lack of pre-existing information and accuracy of information collected in the condition assessment, additional risk factors should be carried.

It is understood that Hydro Quebec (HQ) was performing a review of the electrical systems at the arena. JLR contacted Hydro Quebec to discuss the review and obtain information on the

existing systems and implications of higher demands due to potential mechanical and electrical upgrades. The information provided by HQ is discussed within the electrical scope section 7.0.

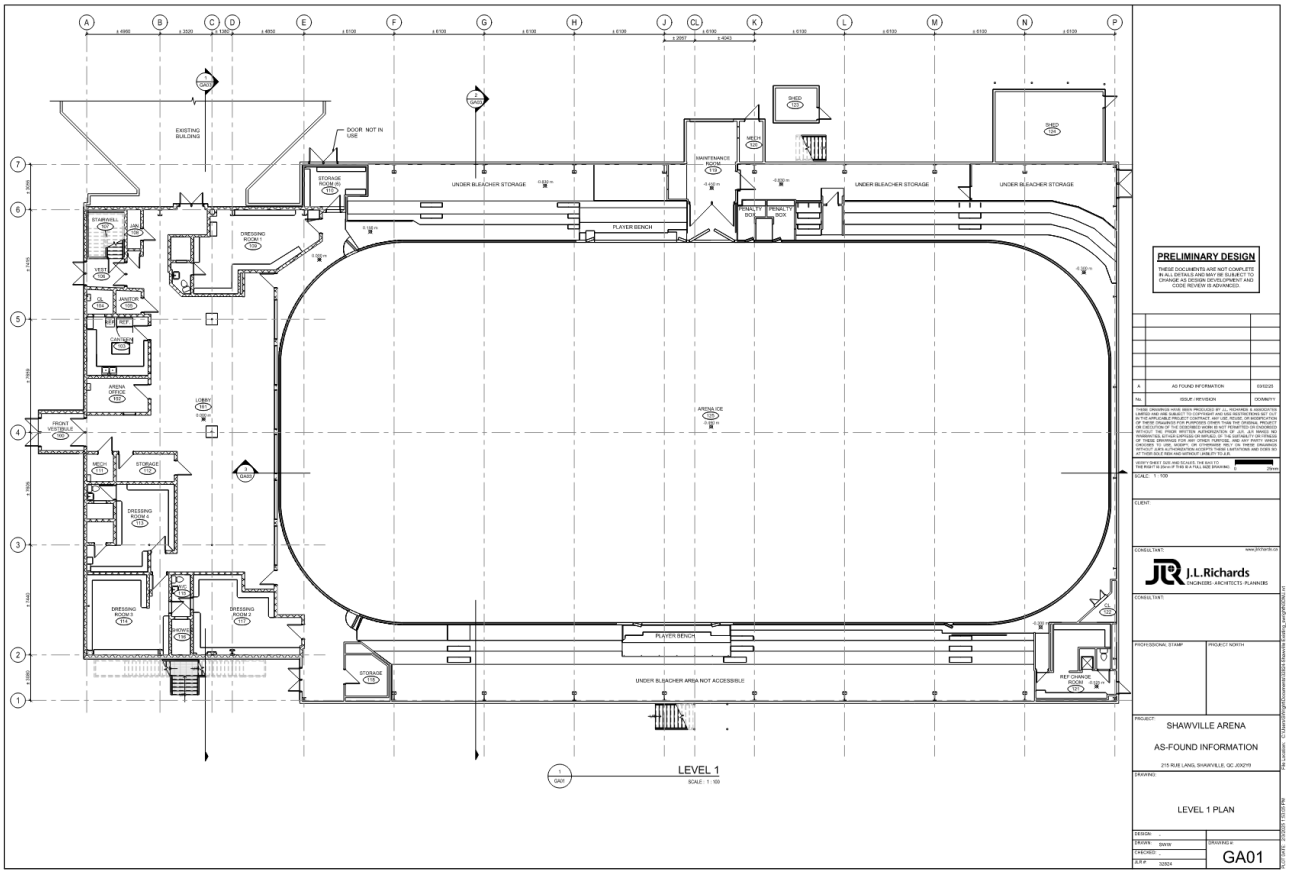

Figure 1: Level 1 Plan

2.0 Methodology

A Pre-Feasibility Study is an analysis which examines various aspects of a project to determine whether the project can be performed within given constraints and to meet the intended objectives.

This Pre-Feasibility Report will analyze a single option per element of the arena. Investigating multiple options was not desired at this time by the Municipality. Recommended action for the anticipated structural, civil, landscape, architectural, mechanical and electrical services to facilitate the retrofit/upgrade shall be analyzed and described clearly within the report.

It should be noted that the limited BCA was performed through a visual review which was limited to items which were accessible without altering the building. Exploratory work was not part of the original scope and therefore not performed to expose structure or other systems hidden

behind finishes; therefore, some of the components of the structure were not available for review. None of the ceiling tiles were removed; therefore, none of the components in those areas were reviewed. Additionally, any mechanical or electrical equipment which was not directly visible was also not reviewed. The recommendations for renovation will be limited for the lesser-known elements. Contingencies should be carried to reflect the availability of the information and visual nature of the review. As the information gaps identified pose significant risk to renovation costs, recommendations on additional studies are provided in section 9 below.

3.0 Architectural Scope

The architectural scope has been developed based on the visual review performed during the limited building condition assessment and therefore the investigation was limited to what was visually accessible. All references in [ ] are based on the requirements of the Quebec Construction Code (QCC), Chapter I – Building, and National Building Code of Canada (NBCC) 2015 (amended). All references are to Division B unless otherwise noted. A high-level code review was performed to identify potential high-level costs to bring the building to code standards.

3.1 Non-compliant Elements – Building Code Requirements

1) The existing second floor construction is currently built with wood joists and plywood, which does not comply with the current Building Code requirement [3.2.2.31]. To implement the new floor, removal in its entirety would be required to reconstruct the floor.
    a. Advantages:
        i. Enhanced Safety: Non-combustible materials, such as steel and concrete, do not ignite or contribute to the spread of fire, significantly improving the safety of occupants and the building.
        ii. Structural Integrity: These materials maintain their strength and stability even when exposed to high temperatures, reducing the risk of structural collapse during a fire.
        iii. Lower Insurance Costs: Buildings constructed with non-combustible materials may qualify for lower insurance premiums due to the reduced risk of fire damage.
        iv. Compliance with Building Codes: Many building codes require the use of non-combustible materials in certain types of construction, ensuring compliance and potentially simplifying the approval process.
        v. Durability: Non-combustible materials are generally more durable and resistant to environmental factors, leading to longer-lasting structures.
    b. Disadvantage:
        i. Cost: The process can be expensive due to the need for new materials and labour.
        ii. Time-consuming: It often takes a significant amount of time, which can disrupt daily activities and extend project timelines.
        iii. Complexity: The work can be complex, considering the structural changes.
        iv. Potential for Hidden Issues: During the rebuild, unexpected problems such as hidden damage or structural issues may be uncovered, leading to additional costs and delays.

2) The existing second floor does not currently have any fire separations which does not comply with the current Building Code requirement [3.2.2.31]. To implement the fire separation, removal of existing ceilings and reinstate with ULC approved 1hr assembly.
    a. Advantages:
        i. Enhanced Safety: It significantly improves fire resistance, giving occupants more time to evacuate safely in the event of a fire.
        ii. Code Compliance: It meets building code requirements.
        iii. Property Protection: It can help limit fire damage to the building structure, potentially reducing repair costs.
        iv. Insurance Benefits: Buildings with fire-rated assemblies may qualify for lower insurance premiums due to reduced risk.
        v. Sound Insulation: Many fire-rated assemblies also provide better sound insulation, enhancing the overall comfort of the building.
    b. Disadvantage:
        i. Cost: Installing a fire-rated assembly could be expensive due to the removals of existing ceiling, fixtures and working around existing partitions walls.
        ii. Complexity: The installation process can be more complex and time-consuming, potentially leading to longer project timelines.
        iii. Weight: Fire-rated assemblies can add extra weight to the structure, which may require additional support and reinforcement.

3) Existing facility isn't equipped with barrier-free showers and water closets within the dressing rooms. [3.8.3.11. & 3.8.3.16.] To implement the installation of the barrier-free facility within the dressing rooms, dedicated floor area would be required and upgrades to existing infrastructure.
    a. Advantages:
        i. Accessibility: They ensure that individuals with disabilities can use the facilities comfortably and independently, promoting inclusivity and equal access.
        ii. Convenience: Having barrier-free washrooms within dressing rooms means that users do not have to travel far to access these facilities, which is particularly beneficial for those with mobility issues.
        iii. Safety: These washrooms are designed with features like grab bars, non-slip flooring, and adequate space for maneuvering, which enhance safety for all users.
        iv. Compliance with regulations: Installing barrier-free washrooms helps facilities comply with accessibility standards.
        v. Enhanced User Experience: Providing accessible facilities can improve the overall user experience, making the space more welcoming and accommodating for everyone.
    b. Disadvantage:
        i. Design and Space Requirements: Barrier free facilities often need to be larger to accommodate all users, which can be a challenge in terms of space within existing footprint.
        ii. Cost: Installing barrier-free facilities within the dressing rooms could be expensive due to the removals of existing walls and tie-in to existing infrastructure.

4) Existing facility isn't equipped with dedicated wheelchair space within the arena portion. [3.8.2.3]. To implement the dedicated wheelchair space, a dedicated floor area would be required for the installation of the ramp and potential removal of existing bleachers.
    a. Advantages:
        i. Accessibility: These spaces ensure that individuals using wheelchairs can easily access and enjoy events without physical barriers.
        ii. Inclusivity: They promote inclusivity by allowing people with disabilities to participate in social and recreational activities alongside everyone else.
        iii. Comfort: Wheelchair spaces are designed to provide comfort and ease of movement, ensuring a better experience for attendees.
        iv. Companion Seating: Often, these spaces include companion seating, allowing friends or family members to sit together, enhancing the social experience.
        v. Enhanced Sightlines: These spaces are typically positioned to offer unobstructed views of the event, ensuring that everyone has a great viewing experience.
    b. Disadvantage:
        i. Design and Space Requirements: Designated wheelchair spaces will require additional area and ramps to accommodate, which can be a challenge in terms of space within existing footprint.
        ii. Cost: Implementing designated wheelchair spaces will be costly.

5) Existing facility isn't equipped with a lift or elevator to the second-floor assembly space. [3.8.3.7.]. To implement the installation of a lift or elevator, a dedicated floor area would be required. The addition of a lift or elevator would require the implementation of barrier-free washroom facilities on the second-floor area.
    a. Advantages:
        i. Accessibility: It ensures that individuals with mobility challenges, including those using wheelchairs, can access all areas of the building.
        ii. Safety: A lift or elevator reduces the risk of accidents related to stair use, such as trips and falls.
        iii. Increased Usage: By making the second floor more accessible, the community hall can host a wider range of events and activities, potentially increasing its usage and revenue.
        iv. Compliance: It helps the building comply with accessibility regulations and standards, which is essential for public buildings.
    b. Disadvantages:
        i. Cost: The installation and maintenance of elevators can be expensive.
        ii. Space Requirements: Elevators require significant space for the shaft and machinery, which might reduce usable space within the building.
        iii. Maintenance: Regular maintenance is essential to ensure safety and functionality, which can be costly.
        iv. Breakdowns: Elevators can occasionally break down, causing inconvenience and potentially requiring expensive repairs.
        v. Energy Consumption: Elevators consume electricity, which can increase the building's energy costs.

vi. Accessibility During Power Outages: In the event of a power outage, elevators may become inoperable, limiting access to the second floor for those who rely on them.

6) Existing facility bleachers are constructed of combustible material which does not comply with the current building code requirement. It is also noted that riser height exceeds what is allowable within the code. Current configuration doesn't have anything dividing the players bench with the spectators, this is a safety concern.
    a. Advantages:
        i. Comfort: Provides comfort and ease of movement, ensuring a better experience for attendees.
        ii. Safety: Installing barriers between player bench and spectators to prevent accidentally or intentionally injuries.
        iii. Accessibility: The space can be designed to integrate barrier-free accessibility.
        iv. Durability: Galvanized steel or aluminum bleachers are strong and can withstand heavy use without showing signs of wear.
        v. Resistance: They can endure various conditions without rusting or corroding.
        vi. Low Maintenance: Galvanized steel or aluminum bleachers require minimal upkeep.
        vii. Safety: Designed to be safe for all users, galvanized steel or aluminum bleachers have no splinters and offer anti-slip properties.
        viii. Aesthetic Appeal: They have a clean, modern appearance that enhances the overall ambiance of a venue.
        ix. Cost-Effectiveness: While the initial investment might be higher, the longevity and low maintenance of galvanized steel or aluminum bleachers offer great value over time.
    b. Disadvantage:
        i. Time-consuming: The process can be time-consuming, particularly if unforeseen issues arise during the project.
        ii. High Initial Cost: The upfront expense and installation can be significant.

3.2 Exterior Upgrades

1) The existing cladding along the arena portion is in poor condition with areas of visible weathering and damaged sections at the bottom perimeter where daylight is observed from within. It is recommended to remove and replace exterior cladding.
    a. Advantages:
        i. Enhanced Safety: Replacing old or damaged cladding can address safety concerns.
        ii. Aesthetic Appeal: Modern cladding options can significantly enhance the appearance of a building, giving it a fresh, updated look.
        iii. Increased Property Value: Upgrading cladding can boost the overall value of the property by improving both its functionality and curb appeal.
        iv. Protection Against Elements: Quality cladding offers better protection against weather conditions, reducing the risk of damage to the building's structure.
        v. Reduced Maintenance: New cladding materials often require less maintenance, saving time and money in the long run.

b. Disadvantages:
    i. Hidden Damage: Once the cladding is removed, there may be unexpected damage to the underlying structure, leading to additional costs and delays.
    ii. Cost: The process can be expensive, especially if high-quality materials are used or if extensive repairs are needed.
    iii. Disruption: The work can be disruptive to occupants, potentially requiring temporary relocation.
    iv. Waste Management: Proper disposal of old cladding materials can be challenging and costly, especially if they contain hazardous substances.
    v. Time-consuming: The process can be time-consuming, particularly if unforeseen issues arise during the project.

2) The existing exterior insulation is missing along the perimeter below the bleacher and unknown thickness along the remaining portions. It is recommended to proceed with re-insulating the arena portion at the same time of re-cladding.
    a. Advantages:
        i. Energy Efficiency: Proper insulation can reduce heating requirements; this would lower energy bills.
        ii. Comfort: Insulated walls help maintain consistent indoor temperatures, eliminating drafts.
        iii. Moisture Control: It helps prevent moisture buildup, which can lead to mould growth and structural damage.
        iv. Extended HVAC Lifespan: Reduced strain on heating systems.
    b. Disadvantages:
        i. High Initial Cost: The upfront expense for materials and labour can be significant.
        ii. Installation Disruption: The process can be disruptive, which can disrupt daily activities and extend project timelines.
        iii. Potential for Hidden Issues: During the rebuild, unexpected problems such as hidden damage or structural issues may be uncovered, leading to additional costs and delays.
        iv. Added Weight: Insulation adds weight to the structure, which might require additional support.

3) The existing windows are original; it is recommended to proceed with the removals and replacement of the existing windows.
    a. Advantages:
        i. Energy Efficiency: Modern windows are designed to reduce heat loss in the winter and keep the building cooler in the summer, which can significantly lower your energy bills.
        ii. Enhanced Comfort: New windows can eliminate drafts and maintain a consistent indoor temperature.
        iii. Low Maintenance: Modern windows often require less maintenance, with features like easy-to-clean glass and durable frames.
    b. Disadvantages:
        i. High Initial Cost: The upfront expense for new windows and installation can be significant.

   ii. Installation Disruption: The process can be disruptive, involving noise, dust, and potential damage to surrounding areas.
   iii. Potential for Poor Fit: If not measured and installed correctly, new windows might not fit perfectly, leading to drafts and inefficiency.
   iv. Environmental Impact: Disposing of old windows and manufacturing new ones can have environmental consequences.

4) The existing roof cladding and insulation appear in good condition, with unknown thermal performance. Further investigation would be recommended to get an understanding of the assembly to ensure it meets the minimum requirement per building code. Proceeding with re-insulating the roof would be beneficial as would re-insulating the exterior walls if R-value is to be found insufficient. The minimum total thermal resistance required for the roof is RSI_T 7.22 (R-41.00). The minimum total thermal resistance required for the exterior walls is RSI_T 4.31 (R-24.47).
   a. Advantages:
      i. Energy Efficiency: Proper insulation can reduce heating requirements; this would lower energy bills.
      ii. Comfort: Insulated roof help maintain consistent indoor temperatures, eliminating drafts.
      iii. Moisture Control: It helps prevent moisture buildup, which can lead to mould growth and structural damage.
      iv. Extended HVAC Lifespan: Reduced strain on the heating systems.
   b. Disadvantages:
      i. High Initial Cost: The upfront expense for materials and labour can be significant.
      ii. Installation Disruption: The process can be disruptive, which can disrupt daily activities and extend project timelines.
      iii. Potential for Hidden Issues: During the rebuild, unexpected problems such as hidden damage or structural issues may be uncovered, leading to additional costs and delays.
      iv. Added Weight: Insulation adds weight to the structure, which might require additional support.

3.3 Interior Upgrades

1) The existing interior finishes appear in good condition. In general, the interior renovations should consist of repainting, new flooring, upgrades to the dressing rooms, to enhance the appearance and functionality of the element and to coincide with barrier-free upgrades.
   a. Repainting (Advantages):
      i. Fresh Look: A new coat of paint can instantly refresh and modernize the look.
   b. Repainting (Disadvantages):
      i. High Initial Cost: The upfront expense to repaint can be significant.
      ii. Time-consuming: The process can be disruptive, which can disrupt daily activities and extend project timelines.
   c. New Flooring (Advantages):
      i. Improved Aesthetics: New flooring can dramatically change the look and feel of a space.

ii. Enhanced Durability: Modern flooring materials are designed to be more durable and easier to maintain.

d. New Flooring (Disadvantages):
   i. High Cost: Quality flooring materials and installation can be expensive.
   ii. Disruption: Replacing flooring can be disruptive, which can disrupt daily activities and extend project timelines.

e. Dressing Room Washroom Upgrades (Advantages):
   i. Improved Aesthetics: New finishes and fixtures can dramatically change the look and feel of a space.
   ii. Enhanced User Experience: Providing renovated facilities can improve the overall user experience, making the space more welcoming and accommodating for everyone.

f. Dressing Room Washroom Upgrades (Disadvantages):
   i. High Cost: Quality flooring materials and installation can be expensive.
   ii. Disruption: Replacing flooring can be disruptive, which can disrupt daily activities and extend project timelines.

7) Existing facility isn't equipped with universal washroom. It is recommended to implement the installation of the universal washroom which a dedicated floor area would be required and potential upgrades to existing infrastructure.
   a. Advantages:
      i. Compliance: It helps meet accessibility standards and building codes.
      ii. Inclusivity: It ensures that people of all abilities, including those with disabilities, can use the facilities comfortably and independently.
      iii. Convenience: Universal washrooms are designed to be user-friendly for everyone, including families with young children.
      iv. Privacy: These washrooms provide increased privacy, which can be beneficial for all users.
   b. Disadvantage:
      i. Design and Space Requirements: Universal washrooms often need to be larger to accommodate all users, which can be a challenge in terms of space.
      iii. Cost: Installing a universal washroom could be expensive due to the removals of existing walls and tie-in to existing infrastructure.

3.4 Building Code Analysis

3.4.1 General

The purpose of this review is to identify the Building Code requirements and summarize JLR's approach about fire and life safety applicable for the existing arena located 215, rue Lang, Shawville, Quebec. This document is based on the requirements of the Quebec Construction Code (QCC), Chapter I – Building, and National Building Code of Canada (NBCC) 2015 (amended). [ ] indicates a QCC article reference. All references are to Division B, unless otherwise noted.

Note that the review assumed that there is a code-conforming firewall separating the arena from the other building. Without this firewall, the structures would be considered a single building which could have a significant impact on the following:

- Building Classification: With a code-conforming firewall, the arena and the other buildings are considered separate structures. This affects how each building is classified and regulated under the building code.
- Fire Safety: The firewall helps prevent the spread of fire between the two buildings, enhancing overall fire safety. This means that in the event of a fire in one building, the firewall will provide a barrier to protect the other building.
- Building Area: Without the firewall, the combined area of the buildings would be considered as one, potentially exceeding the allowable limits for a single building. This could necessitate additional fire protection measures.
- Occupancy and Use: The separation allows for different occupancy types and uses in each building without affecting the other. This can be particularly important if the buildings have different fire safety requirements based on their use.
- Code Compliance: Ensuring that the firewall is code-conforming is crucial for compliance with building codes.

3.4.2 Occupant Load [3.1.17]

The occupant load of building is as follows:

- The occupant load shall be based on the number of persons for which the area is designed, [3.1.17.1.]
- The occupancy was calculated for the arena and recreation room on the second floor and assumed that the adjacent buildings are separated by code compliant firewall and not part of occupant count. As per design of space noted in table below, the allowable occupant load based on area would be 2,204 persons.
- The current washroom facilities for the ground floor area are within the adjacent attached space assumed to be separated by code compliant firewall. As the occupant load has not been calculated for the adjacent building, the following calculation assumes that those washrooms can serve the arena. This would be subject to approval by the Authority having Jurisdiction (AHJ) if no new washrooms were to be added within the arena as part of a major renovation. Based on 7 WC for men and 7 WC for women, the current washroom layout for the entire ground floor allows for 400 men and 175 women within the facility. The second floor Recreation area has 3 WC for men and 2 WC for women, the current washroom layout for this area allows 150 men and 50 women. It is understood that the second floor area is normally locked during regular business hours and the associated washrooms are not always accessible to the public.
- Based on current washroom count, additional washroom facilities would be required to accommodate greater occupant load based on table below and assuming an even split (50/50) between men and women.

Floor Level/Area	Occupancy Type	Occupant Load (Persons)
ARENA SEATING	Group A, Division 3	325 sq.m. / 0.60 = 540 Persons
RECREATION ROOM	Group A, Division 2	255 sq.m. / 1.20 = 212 Persons

3.4.3 Building Fire Safety [3.2]

Occupancy Classification:

- Major occupancies: Group A, Division 3 – Assembly Occupancy - Arena Type.
- Minor occupancy: Group D – Business and personal services occupancies
- Building area: ±2540 sq. m
- Building height: Two Storeys – Approx. 8 m
- Ground floor area: ±2540 sq. m
- Second floor Area: ±420 sq. m
- Gross building area: ±2960 sq. m
- # of streets facing: Three
- 2015 QCC classification: Group A, Division 3 - up to 2 Storeys, [3.2.2.31]
- Max permitted building area: 6,000 sq. m (64,560 sq.ft.)

Building Size and Construction Relative to Occupancy Construction Required:

Non-combustible construction, and:

.1 Floor assemblies shall be fire separations with a fire resistance rating not less than 1 hour.

.2 Mezzanines shall have a fire-resistance rating not less than 1 hour.

.3 Loadbearing walls, columns and arches shall have a fire resistance rating not less than that required for the supported assembly, except that arches are permitted to be of heavy timber construction.

Existing Construction:

.1	Construction:	Non-combustible and Combustible ***Non-conforming***
.2	Roof assembly:	Non-combustible – No rating required ***Conforming***
.3	Sprinklers:	Yes – Wet and Dry System ***Conforming***
.4	Second Floor assembly:	Combustible, Unknown rating, 1 hour required. ***Combustible non-conforming***
.5	Load bearing components:	No rating, 1 hour required. Combustible ***Non-conforming***

3.4.4 Fire Alarm [3.2.4]

- A fire alarm is required for the building in which an automatic sprinkler system is installed. [3.2.4.1.], *As indicated in electrical section, based on their findings, the arena is not equipped with a fire alarm system, non-compliant.*

3.4.5 Provisions for Fire Fighting [3.2.5]

- The building is sprinklered.
- Openings for access to above grade stories are not required. [3.2.5.1]
- Roof access is not required. [3.2.5.3]
- A designated access route for fire department vehicles is provided at the principal entrance of the building. [3.2.5.4]
- Access route is not less than 3 m from principal entrance and not more than 15 m. [3.2.5.5]
- The access route is designed in accordance with [3.2.5.6] 'Access Route Design'.
- The building has adequate water supply [3.2.5.7] serviced by an existing water service.
- A fire department connection is required and is located so that the distance to the hydrant is not more than 45 m and is unobstructed. [3.2.5.16.(2)]
- Based on current findings no action is required.

3.4.6 Standpipe Systems [3.2.5.8]

- Standpipe system is required. [3.2.9.1.(1)(c)]
    - The building is equipped with a standpipe, refer to mechanical section.

3.4.7 Safety Within Floor Areas [3.3]

- There are no suites within the building. [1.4.1.2]
- There are no "public corridors" within the building. [1.4.1.2]
- The Janitor Room shall be separated from the remainder of the building with a fire separation not required to have a fire-resistance rating. [3.3.1.21.(3)]

3.4.8 Design of Hazardous Areas [3.3.6]

- Hazardous materials to be stored in a room separated from the remainder of the building with a 2 h fire separation. [3.3.6.4.(1)]. Currently this requirement has not been identified for this project.
- Dispensing of hazardous material shall not be provided.

3.4.9 Exits [3.4]

- Each floor area is served by two exits. [3.4.2.1.(1)]
- The travel distance within the building is less than 45 m. [3.4.2.5.(1)(c)]
    - Based on current findings no action is required.

3.4.10 Service Facilities [3.6]

- Mechanical rooms shall be separated from the remainder of the building by a fire separation having a fire-resistance rating of 1 hour. [3.6.2.1.(1)]
    - Based on current findings no action is required.

3.4.11 Barrier Free Design [3.8]

- Main entrance is designated as barrier-free pedestrian entrances. [3.8.1.2]
- The approach to the main entrance from the sidewalk is designed in conformance with 3.8.3.2 “exterior walks.”
- Doors from exterior to the vestibule are equipped with power door operators. [3.8.3.3]
- Based on current findings, barrier free facilities are required within the dressing room area. If an elevator or lift is installed to access the second floor, barrier-free facilities should be provided on the second floor.

4.0 Structural Scope

The structural scope has been formed based on the visual review performed during the limited building condition assessment and therefore limited to the structural elements that were visually accessible. In renovation projects, the structural scope is depended on the extent of the renovation that impact the structural elements and associated modifications to support architectural, mechanical and electrical renovation requirements.

The structural section is separated into the two major areas: One (1) Rink structure and Lobby structure, however, is considered to be a single structure with no clear structural separation.

The rink structure is a steel frame Butler building supported on assumed shallow foundations. The primary framing consists of tapered steel moment frames with steel purlins and girts as the secondary framing support. Steel cross bracing acts as lateral support for the structure.

The lobby structure is of similar construction with tapered steel moment frames, purlins, girts and steel bracing. The second floor is constructed of wood joist framing and wood decking. The interior partitions on the first floor are constructed of concrete masonry units.

4.1 Rink Structure

4.1.1 Primary Framing

1) Beams
    a. General scope of renovation
        i. The primary structural horizontal framing members spanning the width of the structure consist of tapered wide flange steel sections. They are in fair-to-good condition, no remediation is currently needed.
    b. Recommendation
        i. It is recommended that the beam members be surface prepped and coated with a zinc-rich coating to extend service life.
    c. Advantages/Disadvantages of renovation
        i. As the members were observed to be in fair-to-good condition, they can remain as is. Given a major renovation is anticipated, recoating will better match the new service life following the renovation.

ii. The beams may need to be strengthened based on the conclusions of any future performed structural reviews in line with the NBCC requirements of a major renovation.

2) Columns
    a. General scope of renovation
        i. The primary vertical members connecting the horizontal members to the column bases consist of welded tapered wide flange steel sections. They were observed to be in fair-to-good condition, no remediation is needed currently.
        ii. The steel column bases available for review displayed signs of moderate rusting. Although there is no immediate concern, the propagation of corrosion can increase exponentially if left unchecked which diminishes the capacity of the member and leads to further issues.
    b. Recommendation
        i. It is recommended that all of the column members be surface prepped and coated with a zinc-rich coating to extend service life.
        ii. It is our recommendation that the steel column bases be thoroughly cleaned of rust followed by application of a zinc-rich coating to prevent further corrosion.
    c. Advantages/Disadvantages of renovation
        i. As the steel columns were observed to be in fair-to-good condition, they can likely remain. Given a major renovation is anticipated, recoating will better match the new service life following the renovation.
        ii. The steel columns may require structural reinforcement depending on the conclusions of any future performed structural reviews.
    d. Risks
        i. As only a handful of the west side column bases were available for review, it is recommended that the east side columns be visually reviewed to confirm their condition. Given the trend of the condition, it is expected that all column bases are of similar condition to the west side members available for review and should be recoated.

4.1.2 Secondary Framing

1) Purlins
    a. General scope of renovation
        i. The steel purlins were observed to be in fair condition with minor localized rusting.
    b. Recommendation
        i. It is our recommendation that areas of rust shall be addressed with thorough cleaning and application of a zinc-rich coating. For costing purposes, it should be assumed that 25% of the total purlin surface area require recoating.
    c. Advantages/Disadvantages of renovation
        i. Removal of rust and applying a zinc-rich coating prevents further corrosion from occurring effectively extending the service life of the system to match other systems.
2) Girts
    a. General scope of renovation

i. The condition of the steel girts along the perimeter of the structure could not be confirmed.

b. Recommendation
   i. The condition of the steel girts along the perimeter of the structure could not be confirmed. As described in section 3.2.1, the exterior cladding is recommended to be replaced. Given the condition of the cladding and limited insulation, the bottom girts up to half the height of the wall should be assumed to be replaced.
   ii. The remainder of the steel girts are to be thoroughly cleaned and coated with a zinc-rich coating.

c. Advantages/Disadvantages of renovation
   i. Replacement of the steel girts reset the service life of the members and allow for better congruency with the surrounding systems service lives.
   ii. Removal of rust and applying a zinc-rich coating prevents further corrosion from occurring effectively extending the service life of the system.

4.1.3 Foundation

a. General scope of renovation
   i. The foundation was not visually accessible for review; therefore, the condition is unknown.

b. Professional Recommendation
   i. At this time, we are not anticipating any foundation remediation.

4.1.4 Slabs

1) Rink Ice Slab
   a. General scope of renovation
      i. The slab was observed to be in fair-to-poor condition with defects to the concrete throughout.
   b. Recommendation
      i. It is understood that the refrigerant slab is scheduled to be replaced. It is therefore recommended to replace the rink slab to reset the service life.
      ii. Given the use of the slab for tradeshows and farm expositions, it is understood that heavy equipment is driven onto the rink slabs. Therefore, for costing purposes, the thickness of the new slab is assumed to be 400mm. Typically, the slab is supported on 4” of rigid insulation with an underlay of heated sand bedding.
   c. Advantages/Disadvantages
      i. Replacement of the rink slab will reset the service life to be congruent with the other structural elements.
2) Rink Perimeter Slab
   a. General scope of renovation
      i. To satisfy minimum code requirements, the wooden bleachers have been recommended to be replaced with a new bleacher system constructed from non-combustible materials as discussed in section 3.1.7.
      ii. Given that the geometry of the bleachers is set, it is anticipated that the replacement option consists of a custom standalone steel frame.

b. Recommendation
    i. To create a level surface for construction of the new system, a 150mm thick reinforced concrete pad is recommended to be constructed. The concrete pad shall be designed to be integrated with the rink slab and extended to the outer perimeter of the structure.
    ii. An 800mm haunch is anticipated at the perimeter of the rink slab to allow for transition and proper separation at the construction joint.

3) Column Foundations
    a. General scope of renovation
        i. The steel columns part of the primary framing structure bear on concrete which was observed to be deteriorated from its original construction condition.
    b. Professional Recommendation
        i. The concrete piers and tie beams are recommended to be repaired to its original condition. It is assumed that the concrete is deteriorated at all primary framing column locations (20 locations). This involves chipping and exposing reinforcing steel for the first foot and reinstating the concrete.
    c. Advantages/Disadvantages
        i. The deteriorated concrete can be addressed simultaneously with the 150mm perimeter slab construction to restore the original construction condition and ensure the column loads are transferred to the foundations as intended.

4.1.5 Dasher Boards

a. General scope of renovation
    i. It is assumed the dasher boards are anchored into the slab and will need to be removed for the rink slab replacement.
b. Professional Recommendation
    i. Given the age of the structure and condition of the boards, it is recommended that the new dasher boards be reinstated to reset the service life.
c. Advantages/Disadvantages
    i. The dasher board system service life can be reset with the replacement of the structural slab. The labour effort to remove and reinstate the dasher boards would already be required if the old system were to be reused.
    ii. Deteriorated steel elements can be addressed with full replacement, resetting service life of the system.
    iii. The cost of the dasher board replacement may be too high to be feasible.

4.1.6 Bleachers

a. General scope of renovation
    i. To satisfy minimum code requirements, the wooden bleachers are recommended to be replaced with a new bleacher system constructed from non-combustible materials as discussed in section 3.1.7.
b. Recommendation
    i. A metal bleacher system is likely the most cost-effective solution. It is recommended that a steel or aluminum solution be implemented.
c. Advantages/Disadvantages

i. It should be noted that the bleachers are a separate system from the primary framing members of the rink structure, therefore, replacement will not affect the primary framing.

4.1.7 Broadcast Booths

1) Broadcast booth in northwest corner of structure
    a. General scope of renovation
        i. The broadcast booth in the northwest corner does not appear to be up to current code (wood construction).
    b. Recommendation
        i. The broadcast booth is to be removed and replaced with non-combustible materials.
2) Broadcast booth in southeast corner of structure
    a. General scope of renovation
        i. Broadcast booth at this location does not appear to be constructed to current codes and standards (wood construction).
    b. Recommendation
        i. The broadcast booth is to be removed and replaced with non-combustible materials.

4.2 Lobby and Community Space

4.2.1 Primary Structure

1) Columns
    a. General scope of renovation
        i. Columns available for review were painted and observed to be in fair-good condition. No immediate remediation is required.
    b. Recommendation
        i. It is recommended that the columns are surface prepped and coated with a zinc-rich coating.
2) Beams
    a. General scope of renovation
        i. Horizontal beam members were not available for review due to the inability to displace ceiling tiles. It is assumed that the beam members are composed of steel similar to the rink structure.
    b. Recommendation
        i. Given the condition of the primary framing in the rink structure, it is recommended that the beam members be surface prepped and coated with a zinc-rich coating.
    c. Risks
        i. The condition of the beams may be worse than anticipated and require structural reinforcement.

4.3 Secondary Structure

1) Purlins
    a. General scope of renovation

i. The condition of the steel girts along the perimeter of the lobby structure could not be confirmed.

b. Recommendation
   i. Given the trend in condition of the secondary structure in the rink area, and to favour conservatism, it is expected that all the purlins are to be surface prepped and recoated.

c. Advantages/Disadvantages of renovation
   i. Removal of rust and applying a zinc-rich coating prevents further corrosion from occurring effectively extending the service life of the system.

2) Girts

a. General scope of renovation
   i. The condition of the steel girts along the perimeter of the lobby structure could not be confirmed.

b. Recommendation
   i. Given the condition of the cladding and limited insulation, the bottom girts up to half the height of the wall should be assumed to be replaced.
   ii. The remainder of the steel girts are to be thoroughly cleaned and coated with a zinc-rich coating.

c. Advantages/Disadvantages of renovation
   i. Removal of rust and applying a zinc-rich coating prevents further corrosion from occurring effectively extending the service life of the system.

4.3.1 Lateral Bracing

a. General scope of renovation
   i. A portion of the lateral bracing elements were available for review and were observed to be in fair condition. Majority of the end connections were not visually available for review.

b. Recommendation
   i. It is recommended that all lateral bracing be surface prepped and recoated with a zinc-rich coating.

c. Advantages/Disadvantages of renovation
   i. Removal of rust and applying a zinc-rich coating prevents further corrosion from occurring effectively extending the service life of the system.

4.3.2 Masonry Walls

a. General scope of renovation
   i. It could not be confirmed which masonry walls, if any, are load bearing.

b. Recommendation
   i. All load bearing masonry walls found to be unreinforced are to be replaced with reinforced masonry walls complete with appropriate slab thickenings. At this time, it is assumed that none of the masonry walls are load bearing and can remain.

c. Advantages/Disadvantages
   i. Architecturally, code compliance can be achieved without removing any of the masonry walls, however, this comes with increased design and difficulty.

ii. Replacing the masonry walls allows for easier manipulation of the floor area to facilitate a more efficient layout further in line with modern codes and regulations.
iii. If the walls are to remain, the service life will not be reset and may require replacement quicker than neighbouring elements.

d. Risks
i. Where load bearing elements are replaced, supplemental steel framing with foundations may be required. At this time, it is anticipated this will not be needed.
ii. Alteration of load bearing masonry walls must be preceded by a structural review to analyze the impact to the gravity system.

4.3.3 Exterior Structures

1) Existing exterior structures
   a. General scope of renovation
      i. The existing exterior structures appear to be in fair condition and are not critical items for replacement.
   b. Recommendation
      i. All exterior steel structures are to be surface prepped and re-coated.
2) New exterior structures
   a. General scope of work
      i. It is expected the inclusion of new mechanical equipment will require construction of additional exterior structures to suit.
   b. Recommendation
      i. A 4m x 3m x 0.3m thick reinforced concrete slab exterior enclosure with fencing should be carried for the exterior equipment.

4.3.4 New Elevator Structures

   a. General scope of work
      i. A lift or elevator has not been included within the facility which does not meet current code requirements.
   b. Professional Recommendation
      i. An elevator or lift is to be constructed and located outside of the footprint of the structure including new reinforced masonry walls and shallow foundations.
   c. Risk
      i. An elevator within the footprint of the structure may not be feasible. An exterior structure may be required to facilitate the elevator construction.

4.3.5 Second Floor Structures

1) Wood decking
   a. General scope of renovation
      i. It is assumed that the second-floor wood decking is supported by the exterior walls and interior intermediate columns and beams.
   b. Recommendation

i. Although there is no immediate structural concern, it is recommended that the wood decking be replaced with non-combustible materials to be compliant with modern codes and regulations (As per [3.2.2.31] discussed in section 3.1 of this report).
ii. It should be assumed that the replacement deck will consist of steel open-web steel joists and concrete filled steel decking over the entire area.

c. Advantages/Disadvantages
i. The service life of the deck can be reset to be more congruent with the neighbouring structural elements.
ii. The system weight of the new floor will need to be carefully selected. Additional weight can impact foundations and the performance of the lateral system increase renovation cost for subsequent upgrades to these systems.

4.4 Risk Discussion and Structural Assumptions

The code defines the class of renovation by major or minor and is ultimately correlated to the scope of the renovation. The following are defined by the commentary L of the 2015 Structural commentary user's guide:

- **Major renovation:** is an extensive renovation to the architectural, structural, mechanical and electrical components in a major portion of the building that extends the useful life of the building. The renovation may or may not involve removal of the wall and ceiling finishes in the project area. A change of use is also considered a major renovation.
- **Minor addition:** A minor addition is an addition having a total weight that is less than 10% of the weight of the existing building.
- **Minor renovation:** A minor renovation is a limited renovation to the architectural, mechanical and electrical components in a portion of the building. The renovation may or may not involve some structural work but does not increase the occupied area of the building. A minor renovation is limited to one floor in a building with three or more storeys and to a part of one floor in a one- or two-storey building; a renovation affecting a larger part of the building is considered a major renovation. Minor renovations must not reduce the capacity of the seismic force resisting system (SFRS).
- **Minor renovation involving structural components:** minor renovation involving structural components is a minor renovation that involves a change to the structure of the existing building (e.g., a renovation that creates an additional opening in a shear wall). The renovation may increase the vertical or lateral capacity of the existing building but must not reduce its lateral capacity.

Major renovations require existing gravity and lateral systems to be upgraded to meet current design standards, which requires extensive analysis and increase renovation costs.

Due to the extensive modifications required to remove combustible materials and the lobby/community area recommended upgrades to meet current code, this classifies as a major renovation.

As part of a major renovation, the structure must be brought up to current codes and standards. A full review of the gravity, wind and seismic loads per the most current applicable codes and

regulation will be required. The following construction/design scope may result from the structural review:

- Lateral system reinforcement (Seismic retrofit)
- Gravity system reinforcement for current environmental loading
- Foundational strengthening as a result of the above 2 points

As such, additional risk/contingency should be carried if such upgrades are required.

In addition to the above, community centres are required per current standards to be classified as high importance. Given that the Municipality does not own the building this should be confirmed prior to design. Typically, unless the arena serves a critical post-disaster shelter function, it does not need to be considered high importance. The objective of high importance structures is to be designed more robust in the event of natural disasters (i.e., ice storms, windstorms, earthquakes) and can be used as a shelter after such an event. If high importance is to be considered, note that design loads for gravity (Snow), wind and seismic are increased by a factor of 1.15 and 1.3, and it would therefore be expected that lateral and gravity system upgrades be required.

In order to reduce risk with structural upgrades, it is assumed that no additional load to the roof structure will be imposed (mechanical units, electrical equipment). It is expected that all mechanical and electrical (M/E) equipment can be installed outside of the footprint of the arena or in locations already occupied by M/E equipment and service the building from the side.

The final use and occupancy of the arena must be confirmed ahead of detailed design. It is understood that at some parts of the year dirt is brought into the structure for fairs or expositions. It is recommended that the structural slab be designed to withstand the expected loading from heavy equipment to ensure long term performance and reduce risk of damaging rink refrigerant systems.

5.0 Civil Scope

5.1 Water Servicing

The civil scope has been formed based on the visual review of the interior, exterior on-site services of the arena, and on-site services performed during the limited condition assessment and therefore limited to what was visually accessible. A description of the on-site services was also provided by Municipal staff who had a general understanding of existing buried services for the arena.

A hydrant flow test was completed in 2024 by the Municipality of Shawville. The test was conducted at Hydrant #20 (test hydrant), located at 219 Main Street, while discharging 1,000 gallons per minute (GPM) at Hydrant #21 (flow hydrant), located at 173 Calumet Road. The available fire flow at Test Hydrant #20 was estimated 147 L/s at 20 psi (2,332 gpm) assuming the test was completed per NFPA 291. A fire flow of 68 L/s (1,078 gpm) at the arena hydrant was estimated accounting for the pressure losses along approximately 170 m of 150 mm watermain between Hydrant #20 and the arena. An assessment of the required fire flow in

accordance with the Building Code, and a comparison with the available fire flow, is beyond the scope of this review.

- General scope of renovation
  - The arena is serviced via a 150 mm diameter watermain fed off of Lang Street and there is another watermain north and east of the arena, off of Clarendon Street, supplying water to three (3) hydrants. There have been no reported reliability issues pertaining to domestic water consumption and, as such, the focus of the renovation is related to meeting the Building Code for fire protection capabilities. An assessment of the required fire flow in accordance with the Building Code, and a comparison with the available fire flow, is beyond the scope of this review. In the event the analysis shows that required fire flows are not being met, it is recommended to loop the 150 mm arena watermain to the municipal watermain east of the arena.

- Advantages/Disadvantages for renovation
  - Looping the watermain will provide two feeds which will reduce pressure loss during high demands, enhance long-term reliability and improve available fire flows. It will also provide redundancy in case of a break in the system. It is noted that the work may involve temporary service disruptions.

- Risk assessment and professional recommendation
  - Since the system is not looped, there is a risk that available fire flow may not meet the requirements under the Building Code. It is recommended to perform an assessment of the required fire flow in accordance with applicable Quebec regulations, and a comparison with the available fire flow. If the assessment identifies a shortfall, looping the existing lines could be a solution, this will require installing 120 m of new watermain.

5.2 Sanitary Servicing

- General scope of renovation
  - The arena is currently serviced by a 150 mm diameter sanitary pipe connected to the sanitary sewer on Lang Street. There has been no reported capacity or operational issue with this pipe and the sewer service appears to be providing the intended level of service for the arena. It has been reported by Municipal Staff that some floor drains are currently connected and discharge to the existing storm system and should be redirected to the sanitary sewer to conform to the Building Code.

- Advantages/Disadvantages for renovation
  - Redirecting improperly connected floor drains to the sanitary system will bring the system in compliance with the building code and remove flow contributions to the storm sewer system which has been reported to surcharge during heavier rain events. The condition of the existing sanitary sewer service is unknown. Due to its age, a CCTV inspection is recommended to confirm there are no blockages or structural defects in the sewer line. A capacity assessment, based on projected water usage should be performed as well. Replacing aging sections showing early

signs of structural defects will increase reliability and reduce the risk of system failure.

- Risk assessment and professional recommendation
  - A new CCTV inspection is recommended to assess the condition of the existing system, and a flow capacity analysis should be conducted to confirm whether the sanitary system can accommodate the additional load. If deficiencies are found, targeted repairs, pipe replacements, or upgrades should be considered.

5.3 Stormwater Servicing

- General scope of renovation
  - Drainage for the side of arena is accommodated via two undersized 100 mm perforated pipe systems along the north side of the arena and a lone catch basin connected to an existing 150 mm perforated pipe on the east side. Existing drainage issues have been reported at the back of the arena as well as water ingress into the building in the bleacher area during spring freshets and major storm events. Water ingress into the building could potentially be resolved by re-grading and sloping away from the building. It is recommended to replace the undersized perforated pipe system along the north and east side of the building combined with regrading to improve surface drainage and capture. Approximately 300 m of 250 mm diameter perforated pipe system will be required. In the absence of a topographical survey, the extent of re-grading has been established at 2,000 sq m. which is roughly half the area needed to be reinstated with topsoil and seeding. A more precise opinion of probable cost can be provided after completion of a detailed topographic survey. Some building floor drains, including those in the Zamboni room, are currently connected to the storm system instead of the sanitary sewer. These connections should be redirected to meet code requirements. Site grading issues have also led to water pooling in the rear of the arena, requiring further evaluation.

- Advantages/Disadvantages for renovation
  - Improvement to the storm drainage system will increase capture and conveyance of storm runoff and address the nuisance ponding issues reported at the back of the arena. Improving sloping away from the building should mitigate the reported water infiltration issues into the arena.

- Risk assessment and professional recommendation
  - The extent and severity of the drainage issue at the back of the arena cannot be assessed without a detailed topographical survey. The estimated remedial measures are based on site observation and accounts of the issues reported by Municipal staff. As such, a detailed topographical survey is recommended. Peak storm runoff during infrequent events, such as the 5-year storm, are estimated to properly size the new storm sewer system at the back of the arena. Finally, a CCTV of the existing sewers, immediately downstream of the new arena system should be performed to confirm its condition.

6.0 Mechanical Scope

6.1 Fuel Tanks

There are nine (9) outdoor fuel storage tanks, eight (8) propane tanks and one (1) oil tank. It is recommended that the fuel storage tanks serving furnaces and domestic hot water heaters be decommissioned and removed. All sources of space and domestic water heating will be converted to electric. Fuel piping serving the furnaces and domestic hot water tanks should also be removed. Contingency should be carried in the case that contaminated soils are encountered during construction.

6.2 Ventilation

6.2.1 Space Ventilation

The building is currently served by two (2) propane fired air handling units. The unit serving the lobby and dressing Room 1 has reached the end of its service life. The furnace serving dressing Rooms 2, 3 and 4 is expected to be serviceable until 2034. However, neither furnace provides outside air to the building. The Quebec Construction Code states that outdoor air shall be supplied at rates equal or higher than the rates required by ASHRAE Standard 62.1.

New ventilation equipment is therefore required to achieve the ventilation required by code. Energy Recovery Ventilators (ERVs) are recommended to increase energy efficiency. ERVs use exhaust air to pre-heat or pre-cool outside air, which reduces energy consumption. It is recommended that new air handling units be capable of energy recovery.

Based on the space layout, it is expected that three (3) ERVs are required. The ERV's evaluated for costing purposes are sized to provide 1,000 litres per second (L/s). However, a detailed ventilation analysis is required to ensure proper ventilation throughout the building. The units should be selected with flow rates to provide space heating and cooling, in addition to ventilation air.

The roof is not a suitable location for ERVs. It is recommended that these be placed outdoors on a concrete pad with vandal-proof fencing surrounding the units. The duct main penetrations in the building can be located at the exterior of the existing mechanical rooms.

New supply and return ductwork will be required throughout the building to suit the required air volumes and distribution. For the purposes of this report and costing, a like-for-like replacement shall be considered.

6.2.2 Dehumidifiers

The existing dehumidifier is expected to reach end of life in 2027. It is expected that a new dehumidifier will require electric resistance heating to reactivate the desiccant media within the unit. Alternatively, a natural gas fired reactivation section could be used. However, it may be cost prohibitive to connect to a new utility for a single equipment connection.

It was noted that the existing dehumidifier is not able to maintain the humidity setpoint in the early months of the ice making season. The space humidity will be affected by the building envelope, which is noted to be leaky. Upon repairs to the building envelope, a detailed analysis should be performed to ensure a new dehumidifier is appropriately sized. For the purposes of this report and costing, a like-for-like replacement shall be considered.

The equipment is expected to be located in the same location as the existing.

6.2.3 Exhaust Fans

Washroom exhaust fans should be removed, and the exhaust ductwork be routed to the ERV serving that zone to allow for energy recovery.

The exhaust fans in the furnace rooms should be replaced. The size of the replacement exhaust fans will depend on the new use for those spaces, as the furnaces will be removed as per section 6.1.2.1.

The exhaust fans serving the ammonia and ice resurfacing rooms appear to be in fair condition and may not need replacement. However, it is recommended that they be replaced to ensure the exhaust rates meet the current code.

The exhaust fans serving the kitchens do not appear to meet current codes and standards. The two exhaust hoods should be replaced with hoods, fans and ductwork that meets NFPA 96 requirements.

6.3 Domestic Water Systems

6.3.1 Domestic Hot Water

Domestic hot water systems in the building are provided by multiple hot water heaters throughout the building. The current propane domestic hot water heaters should be removed and replaced with electric domestic hot water heaters.

The venting and propane fuel lines should be removed from the propane-fueled domestic hot water systems.

6.3.2 Plumbing Fixtures

Many of the plumbing fixtures are still in fair-to-good condition. However, it is recommended that that all fixtures be replaced with low flow fixtures.

6.4 Heating and Cooling Systems

There are four (4) propane radiant tube heaters serving the spectator areas of the rink. The propane heaters are due to be replaced due to poor condition. It is recommended that they be replaced with electric radiant heaters.

Heating and cooling of the spaces will be provided by the ERV AHU units, equipped with an integral heat pump and electric resistive backup heat. Heat pumps are more efficient than hot

water boilers, but generally cannot operate at temperatures below -13°C. The AC units in the upstairs community room should be removed, as they would be made redundant by the ERV serving that space.

Electric unit heaters in the ice resurfacing room, VIP viewing box, referee room and ammonia room have exceeded their service life and should also be replaced.

6.5 Ice Rink Refrigeration System

The components of the ammonia refrigeration system appear to have been replaced at different times. The conditions of the various components vary from poor to fair. It is possible to replace the aged components, such as one of the compressors, the compressor motors, portions of the brine circulation piping, the brine circulation pump and portions of the ammonia piping. However, due to the extensive replacements required, it is recommended that a new ice rink refrigeration system be installed.

In the case of a full system replacement, carbon dioxide (CO_2) should be considered as a refrigerant. CO2 systems allow for waste heat recovery at higher temperatures. The high temperature waste heat can be used to pre-heat domestic water. It is recommended that a refrigeration consultant be involved in the design of an ice rink refrigeration system.

The brine system header serving the ice rink appears to be in poor condition. As described in section 4.1.4, the concrete slab under the ice rink is to be replaced. Embedded brine piping, which is approaching the end of its service life, may be damaged during the slab replacement. It is recommended that the brine piping cooling the ice rink be replaced to suit the new slab.

7.0 Electrical Scope

7.1 Code & Standard Review

The following code non-conformances were identified during the site review:

- The arena is not equipped with a fire alarm system.
- Exit signs do not meet latest code in terms of placement, visibility and finish.
- Not all wiring and cabling are FT4 rated and are not totally enclosed in metallic raceways.
- The average illumination of battery-operated remote heads will not guarantee average 10 lx at floor level on all exit pathways.
- No short circuit or arc flash levels indicated on distribution equipment.

7.2 Result of Condition Assessment and Code Compliance

The condition assessment of electrical systems resulted in the following sections.

Recommendation on renovation scope is subsequently provided and address code deficiencies in section 7.3.

7.2.1 Lighting Fixtures

In general, the existing lighting fixtures have exceeded their average useful life and their condition is deteriorating. All lighting fixtures are to be replaced and coordinated with the proposed architectural renovation to meet minimum illumination requirements.

7.2.2 Wiring Devices

Several wiring devices, including lighting toggle switches and receptacles, have exceeded their average useful life and are in poor condition. The cover plates on most receptacles are either damaged or have signs of rust. All receptacles should therefore be replaced.

7.2.3 Distribution Equipment

Panels A & B have exceeded their average useful life and should be replaced as soon as possible.

NMD90 (Romex) wiring used to feed different loads which is not code compliant in commercial buildings.

Main service disconnect switch had exceeded its average useful life and exhibits signs of rust.

Distribution splitters and disconnect switches have exceeded their average useful life and exhibit signs of rust.

Ice rink motor starter panel has exceeded its average useful life and exhibits signs of rust.

Motor equipment terminations exhibit signs of rust increasing likelihood of loose power connections.

7.3 Electrical Renovation Scope

7.3.1 Electrical Distribution

The main incoming services, consisting of three independent feeds (two services 150kW each @ 600V and one service 500kW @120/240V), shall be consolidated and replaced with a new one. To accomplish this, a detailed load evaluation and estimation must be conducted in coordination with the mechanical discipline to determine the expected maximum demand at the renovated arena and allow for coordination with Hydro Quebec. The estimated cost for any potential system upgrades due to capacity requirements is dependant on the evaluations conducted and can be determined within the subsequent phase and coordination with Hydro Quebec.

The upgrade of mechanical systems in section 6 above estimates an addition of approximately 400kW to the existing electrical demand. An independent primary service replacement feasibility study should take place as early as possible to determine probable design options for the primary service upgrade with Hydro Quebec. According to Hydro Quebec, the maximum allowed primary service substation that may be provided on the premises is approximately 750kVA.

120/208V distribution shall be transformed with K-13 rated dry type transformers within the arena to reduce high short circuit currents within the downstream power distribution system.

All existing distribution panels, disconnect switches and splitters will be demolished and replaced with new switchboards and panel boards of suitable ratings and interrupting capacities.

New motor control centres complete with VFD starters and/or additional distribution will be provided in coordination with mechanical for all new and upgraded mechanical equipment as well as the new ice rink equipment.

New heavy duty NEMA 3R rated local disconnect switches will be provided for all mechanical equipment.

All new distribution equipment shall be sprinkler-proof and rust resistant for longevity.

All wiring and cabling will be replaced with new and are compliant with the following:

- RW90 wires in metallic conduits throughout.
- RW90 with metallic flexible conduits or Teck 90 cables c/w liquid-tight fittings for equipment terminations.
- FAS wiring in metallic conduit for fire alarm.
- RWU90 in PVC conduits and weatherproof junction boxes for new feeders installed outdoors and underground (i.e., outdoor lighting).
- Fire-rated feeders in metallic raceways for fire alarm and other life safety systems for circuits passing through multiple fire zones.

7.3.2 Lighting Retrofit

It is highly recommended to conduct lighting retrofit within the arena. The scope of work will consist of the following:

- Select new LED lighting fixtures for each space.
- Develop illumination calculations for each space to achieve the recommended illumination as per IESNA.
- Provide new low voltage lighting controls with dimming capabilities.
- Provide new circuit drawings for lighting.
- Replace all inter-fixture wiring with new.
- Replace new exit signs with new dual fed AC/DC with running man pictogram.
- Provide directional exit signs where required.
- Provide emergency lighting via battery inverter system throughout the arena achieving an average of 10 lx on floor. Illumination calculations for emergency will be required during design stage.
- Maintain a night light scene within the arena during hours of non-occupancy.
- Provide occupancy sensors throughout common spaces and low voltage keypads for lighting control and dimming where required.

- Replace outdoor perimeter lighting with new and provide site lighting with full cutoff feature to enhance parking facilities. Low voltage photocells will be used for automatic controls and energy saving.
- New lighting design shall be compliant with ASHRAE 90.1.

7.3.3 Fire Alarm System

A new addressable fire alarm system shall be installed as per CAN/ULC S524 in the arena complete with the following:

- Manual pull stations c/w tamperproof covers at all exit doors.
- Supervise all sprinkler and standpipe related valves and waterflow switches.
- Supervise the wet chemical kitchen suppression system.
- New fire signal receiving center as per CAN/ULC S561 providing 24/7 monitoring and connection to the fire department.
- New fire alarm wiring using FAS cabling in metallic conduits.
- Fire-rated wiring when going from one fire zone to another.
- Provide audible and visible notification appliances for evacuation in case of fire.
- Provide battery back up for the fire alarm system and the notification circuits.
- Provide CO detection where required.
- The new fire alarm system shall be verified as per CAN/ULC S537.
- Integrated testing of all life safety systems as per CAN/ULC S1001.

7.3.4 Wiring Devices

Replace all wiring devices such as receptacles and toggle switches with new.

Provide Level 2 EV car chargers at the parking area as well as for the new electric ice resurfacer (Zamboni).

7.3.5 AV/Security/ICT Systems

A security specialist shall be hired during the design stage to propose a suitable upgrade for the existing Security systems.

An ICT specialist shall be hired during design stage to propose a suitable upgrade for the existing ICT systems. This includes telecommunication services to the site such as Bell or Videotron.

7.3.6 Electrification of Existing Mechanical Systems

The dehumidifiers will be replaced with new electrical units. ERVs c/w DX compressors will be added to bring ventilation up to code throughout the arena. The existing propane fired domestic hot water tanks will be replaced with new electrical units. The four propane heaters in the spectator area will also be replaced with electric units.

All the above upgrades are estimated to add approximately 400kW to the maximum demand load at the arena.

7.4 Advantages/Disadvantages

The renovation of electrical systems will improve code compliance for life safety, prevent unscheduled shutdowns, reduce risk of electrocutions, and enhance control over the building services within the arena.

Replacing equipment that has exceeded their average useful life will increase reliability and reduce the risk of failure. However, the project may involve significant costs, potential disruptions to adjacent buildings during construction, and the need for schematic and detailed design before implementation.

Due to the age of the existing infrastructure, all electrical equipment will be required to be replaced with new to provide a robust system for the next 35+ years.

7.5 Risk Assessment and Professional Recommendation

The existing electrical systems and components identified within the limited building condition assessment report dated November 2024, and within this report should be, in our opinion, replaced or upgraded as soon as possible. Multiple paths may be adopted such as full renovation of electrical systems versus system-by-system upgrades. Another element that may impact the renovation path would be the mechanical system's upgrade strategy. Therefore, we recommend careful coordination between M&E systems due to their interdependencies.

It is the opinion of the author that electrical and mechanical systems' renovation be investigated, designed and executed simultaneously to reduce the total renovation costs.

The primary service upgrade shall be investigated as soon as possible with Hydro Quebec to evaluate the available upgrade options c/w order of magnitude costing and scheduling.

8.0 Opinion of Probable Cost

As part of this feasibility report, a cost consultant has been carried to provide a cost estimate for the above architectural, structural, civil, mechanical and electrical renovation scope. The estimate will be provided to Class D precision based on the available information. The opinion of probable construction cost (OPCC) report can be found in Appendix A.

The Class D cost estimate for the renovation work is estimated at $16,067,400, excluding the construction allowance. The 5% construction allowance specified in the OPCC report totalled $803,400. Other exclusions from the total cost such as construction escalation contingency and any investigation allowance can be seen within the executive summary on page 1 of the OPCC report.

An itemized breakdown is included within the OPCC report. As this is an older structure, there is inherent risk with a major renovation project. Unknown or hidden conditions can be uncovered during the construction or investigation phase which affects the construction cost of the project; therefore, contingency should be carried.

On March 4, 2025, the US Government implemented 25% tariffs on select Canadian imports (Canadian energy excluded) and in retaliation, the Canadian government imposed 25% tariffs on select American imports. It is unknown when or if the tariffs will be rescinded or whether further tariffs are to come. Consideration to government-imposed tariffs have been excluded from the Class D estimate, therefore, unforeseen cost increases to materials should be noted. It is expected to see some market volatility for select materials and equipment required for this renovation depending on future tariff policies in place at the time of construction.

9.0 Next Steps/Recommended Studies

Information gaps for the structure and the site remain. The following investigations were recommended to be performed to aid in the overall understanding of the structure and the reliability of the feasibility report:

- A foundation investigation alongside a geotechnical investigation.
- Detailed structural analysis to determine if code upgrades are required.
- Topographic survey of the surrounding site and arena.
- CCTV of underground systems.
- In-depth investigation of building humidity control requirements.
- Electrical – enhance the as-constructed electrical drawings (layouts, diagrams, risers, etc.) with the help of a qualified electrician.
- Electrical – a detailed load evaluation and estimation needs to be conducted in coordination with the mechanical discipline to determine the expected maximum demand at the renovated arena alongside coordination with Hydro Quebec.

The investigations above were not performed prior to the issuance of this report, therefore it should be noted that there will be higher risk in the arena recommendations and assessment.

Given the limited nature of the available information and scope for this study, if the Municipality would like to proceed in improving the precision of the renovation budgets, additional studies and design tasks should be performed to help reduce risks. Associated budgetary costs are included to help the Municipality plan for the next phases of the project. The recommended additional studies can be seen below:

- Prepare concept renovation drawings
    - Concept renovation drawings can be prepared to better understand the renovation scope and aid in design. Additionally, concept drawings will increase the accuracy of opinion of probable construction cost estimates.
        - Approximate cost: $40,000.00
- Updated Feasibility Study
    - An updated feasibility study can be conducted following the completion of the above-noted investigations. Filling key information gaps to confirm assumptions from the pre-feasibility report will increase the accuracy of the recommendations and eliminate unknowns.
        - Approximate cost: $70,000.00

  - Structural analysis of the building includes a full review of the gravity, wind and seismic loads per the most current applicable codes and standards.
    - Approximate cost: $25,000.00
- Designated Substance report
  - A designated substance report (DSR) is a document prepared for a structure identifying designated substances such as lead, asbestos and mercury. It should be noted that in order to complete any demolition or construction work inside the structure, a DSR will need to be performed.
    - Approximate cost: $20,000.00
- Geotechnical Investigation/Contaminated Soils
  - A geotechnical investigation is recommended to supplement critical information for the site. Confirmation of various parameters such as soil composition (grain size distribution analysis), groundwater table, and subgrade properties (bearing capacity, moisture content) will be required for any major renovation project.
    - Approximate cost: $45,000.00
- Intrusive openings within exterior walls and roof to determine their current thermal performance and gain a detailed understanding of the condition of the wall and roof assemblies.
    - Approximate cost: $20,000.00
- Detailed code review of the building.
    - Approximate cost: $15,000.00
- Hydrant flow test and assessment of the capacity of the existing on-site water supply system
  - Fire flow test and topographic survey to assess stormwater flow paths and confirm as-built servicing locations.
    - Approximate cost: $5,000.00
- Topographic survey
    - Approximate cost: $15,000.00
- CCTV inspections for both sanitary and storm systems
    - Approximate cost: $5,000.00
- Estimate sanitary and storm flows and size new sanitary and storm sewer system
    - Approximate cost: $10,000.00

It is understood that the Municipality would also like to consider the option of constructing a new arena prior to making a decision on renovation. In the case that the feasibility and cost of a proposed major renovation should need to be compared with the feasibility and cost of constructing a brand-new facility, we would recommend the above be undertaken.

10.0 Conclusion

This report has been prepared for the Municipality of Shawville to provide input and recommendations for renovation of the existing Shawville Arena structure complete with a Class D opinion of probable construction cost estimate. The report includes a description of the scope breakdown for the anticipated structural, civil, landscape, architectural, mechanical, and electrical services recommended or required to facilitate the retrofit/upgrade. It is recommended that this report be read in conjunction with the Limited Building Condition Assessment and Summary of Systems prepared by J.L. Richards & Associates Limited, dated November 2024.

It should be noted the objective of the report is to provide recommendations to bring the building to meet minimum code requirements and standard design practices. No appetite was given to improve systems above minimum code and industry standards as instructed by the Municipality.

Section 9 outlines recommended investigations to be performed to aid in the overall understanding of the structure and the reliability of the feasibility report and should be considered. The total estimated soft cost required for investigative work ahead of preparing construction documents is approximately $270,000. This excludes the engineering design fee which can vary from 5-8% of construction cost depending on market trends.

The Level D cost estimate totalled $16,067,000, excluding the construction allowance. Please note that design and pricing allowance has been included in the OPCC at 15%. The 5% construction allowance specified in the OPCC report totalled $803,400 and is not included in the $16,067,000 cost. The detailed breakdown can be seen in Appendix A of the OPCC report provided by Hanscomb Ltd. in Appendix A of this report.

This report has been prepared by J.L. Richards & Associates Limited for the Municipality of Shawville's exclusive use. Its discussions and conclusions are summary in nature and cannot properly be used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report is based on information, drawings, data, or reports provided by the named client, its agents, and certain other suppliers or third parties, as applicable, and relies upon the accuracy and completeness of such information. Any inaccuracy or omissions in information provided, or changes to applications, designs, or materials may have a significant impact on the accuracy, reliability, findings, or conclusions of this report.

This report was prepared for the sole benefit and use of the named client and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited, and anyone intending to rely upon this report is advised to contact J.L. Richards & Associates Limited in order to obtain permission and to ensure that the report is suitable for their purpose.

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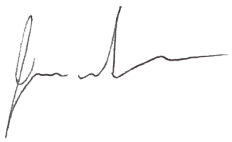

Reviewed by:

Orlando Barone, OAA, OAQ, LEED AP
Senior Architect

Encl.

Appendix A	Opinion of Probable Construction Cost – Hanscomb Limited
Appendix B	As-Found Drawings
Appendix C	Shawville Arena Limited Building Condition Assessment and Summary of Systems

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ENGINEERS · ARCHITECTS · PLANNERS

Appendix A

Class D Estimate –
Shawville Arena Pre-Feasibility,
Hanscomb Limited

CLASS D ESTIMATE

SHAWVILLE ARENA
PRE-FEASIBILITY
SHAWVILLE, QC

Prepared for:
J.L. Richards & Associates Limited

March 25, 2025
(Revised: Mar. 28, 2025)

Hanscomb
QUANTITY SURVEYORS

March 25, 2025 Ref # OTT6289
(Revised: Mar. 28, 2025)

Hanscomb
QUANTITY SURVEYORS

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Attn: Eric Nisioiu, EIT

Re: Shawville Arena, Pre-feasibility, Shawville, QC

Dear E. Nisioiu:

Please find attached our Class D Estimate for the Shawville Arena, Pre-feasibility in Shawville, QC.

This Class D Estimate is intended to provide a realistic allocation of direct construction costs and is a determination of fair market value. Pricing shown reflects probable construction costs obtainable in the Shawville, QC area on the effective date of this report and is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the work.

Hanscomb has prepared this estimate(s) in accordance with generally accepted principles and practices. Our general assumptions are included in Section 3 of this report and any exclusions are identified in Section 1.6. For quality assurance, this estimate has been reviewed by the designated Team Lead, as signed below. Hanscomb staff are available and pleased to discuss the contents of this report with any interested party.

Requests for modifications of any apparent errors or omissions to this document must be made to Hanscomb within ten (10) days of receipt of this estimate. Otherwise, it will be understood that the contents have been concurred with and accepted.

We trust our estimate is complete and comprehensive and provides the necessary information to allow for informed capital decisions for moving this project forward. Please do not hesitate to contact us if you have any questions or require additional information.

Yours truly,

Hanscomb Limited
Team Lead

Jeff, Ho Yeung Cheung
PQS, MRICS, MHKIS
Quantity Surveyor

Hanscomb Limited
Principal / Estimate Reviewer

Nicolas Serge
PQS, MRICS
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EXECUTIVE SUMMARY

This Class D Estimate is intended to provide a realistic allocation of direct construction costs for the Shawville Arena, Pre-feasibility, located in Shawville, QC. Hanscomb recommends that the Owner and design team carefully review this document, including line-item descriptions, unit prices, exclusions, inclusions, assumptions, contingencies, escalation, and mark-ups. If the project is over budget or has unresolved budgeting issues, alternatives should be evaluated before proceeding to the next design phase.

The following are the highlights of this Class D Estimate:

Project Cost Highlights:

Gross Floor Area (GFA)	3,282 m2
Unit (count, linear measure, etc.)	N/A
Total Construction Cost	**$16,067,000**
Cost per GFA	$4,895.49/m2
Unit Cost	N/A

Allowances included in the estimate:

- **15.0%** design & pricing contingency
- **No** escalation from March 2025 to the undetermined construction start
- **5.0%** construction contingency (excluded in the above construction cost and provided separately as an Owner's contingency on the summary page)

The Degree of Accuracy expected for this Class D Estimate is **+/- 30%**. In other words, bid results might vary by this amount if the construction budget were set at this milestone estimate. In today's market, projects are trending to the higher end of the plus range.

Base Assumptions:

All costs are estimated on the basis of **competitive bids** (a minimum of at least 3 general contractor bids and at least 3 subcontractor bids for each trade) being received in Shawville, QC in **March 2025** based on a **stipulated sum** form of contract. If these conditions are not met, bids received could be expected to exceed this estimate.

Exclusions

- Cost of contaminated soil removal
- Cost of hazardous material (e.g. asbestos, lead, PCB, etc.) removal
- Soft Costs (e.g. professional fees, building permit, development charges, owner's staff and management, relocation costs, etc.)
- Financing costs
- Special audio, visual, security equipment or installation other than the provision of empty conduit systems carried in the electrical division
- Window treatments
- In-contract equipment and ICAT beyond that identified in this estimate
- Loose furniture, furnishings, equipment and ICAT
- Escalation contingency
- Value-added tax (e.g. Harmonized Sales Tax, Goods and Services Tax, or other)
- Unexpected labour unavailability and productivity disruptions leading to delays and added costs
- Supply chain disruptions leading to delays and added costs
- The allowance for investigations recommended in the pre-feasibility report to be performed to aid in the overall understanding of the structure and the reliability.
- Any premiums resulting from Canadian Foreign government-imposed tariffs

The details of this estimate are provided in the subsequent pages of this report for your review, comment and acceptance.

TABLE OF CONTENTS

Appendices

1. INTRODUCTION

1.1 PURPOSE

This Class D Estimate is intended to provide a realistic allocation of direct construction costs for the Shawville Arena, Pre-feasibility, located in Shawville, QC, with the exception of the items listed in 1.6 Exclusions.

1.2 DESCRIPTION

The Shawville Arena, Pre-feasibility located in Shawville, QC is comprised of the following key elements:

The project includes 3,282 m2 of two-storey lobby and community space with single storey rink arena. The scope of work includes but is not limited to new floor construction, structure restoration, exterior enclosure upgrade, interior upgrade, elevator, mechanical installation, electrical installation, demolitions, and site works. No specific LEED designation is targeted but the project will meet all applicable codes and standards.

1.3 METHODOLOGY

Hanscomb has prepared this estimate(s) in accordance with generally accepted principles and practices. Hanscomb staff are available to discuss its contents with any interested party.

From the documentation and information provided, quantities of all major elements were assessed or measured where possible and priced at rates considered competitive for a project of this type under a stipulated sum form of contract in Shawville, QC.

Pricing shown reflects probable construction costs obtainable in the Shawville, QC area on the effective date of this report. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the work.

1.4 SPECIFICATIONS

For building components and systems where specifications and design details are not available, quality standards have been established based on discussions with the design team.

1. INTRODUCTION

1.5 ESTIMATE CLASSIFICATION AND COST PREDICTABILITY

Estimates are defined and classified based on the stage of a project's development and the level of information available at the time of the milestone estimate.

> *This Class D Estimate is considered to have an expected degree of accuracy of* ***+/- 30%****. In other words, bid results might vary by this amount if the construction budget were set at this milestone estimate. Under stable market conditions, fierce competition and scope reduction might result in costs coming in under the milestone estimate. However, in today's market, projects are trending to the higher end of the plus range.*

At the initial stages of a contemplated project, the cost accuracy of the estimate is low as there may be little or no information available to inform a first high-level concept estimate or order of magnitude estimate. As a project nears design completion and is ready to be released to market for tender, the level of accuracy of the estimate is high as the detail is generally extensive and typically represents the information on which contractors will bid.

Milestone cost estimates or "checks" are recommended as the project design develops to keep track of scope and budget. Early detection of potential budget overruns will allow for remedial action before design and scope are locked in. The number of milestone estimates will depend on a project's size and schedule and cost predictability will improve as the design advances.

According to the Canadian Joint Federal Government/Industry Cost Predictability Taskforce, industry standards for estimate classification and cost estimate accuracy may be summarized as follows:

COST ESTIMATE CLASSIFICATIONS							
GOC	OME	D	C	← B	→ A		
DND		Indicative		Substantive			
	ROME	D	C	← B	→ A		
AACE	5		4	3	2	1	
RAIC			Sketch Design	Design Development	Contract Documents	Tender Documents	
Design Documentation % Complete			12.5%	25%		95.0%	100%
Cost Estimate Accuracy (+/-%)	+/-30%		+/-20% <30%	+/-15% <20%		+/-10% <15%	+/-5% <10%

Legend

GOC	Government of Canada
DND	Department of National Defence
AACE	Association for the Advancement of Cost Engineering
RAIC	Royal Architectural Institute of Canada
OME	Order of Magnitude Estimate
ROME	Rough Order of Magnitude Estimate

While the classification categories differ from one authority to the next, the overarching principle for cost predictability remains the same – as the level of detail and design development increases, so does the level of accuracy of the estimate.

1. INTRODUCTION

1.6 EXCLUSIONS

This Class D Estimate does not provide for the following, if required:

- Cost of contaminated soil removal
- Cost of hazardous material (e.g. asbestos, lead, PCB, etc.) removal
- Soft Costs (e.g. professional fees, building permit, development charges, owner's staff and management, relocation costs, etc.)
- Financing costs
- Special audio, visual, security equipment or installation other than the provision of empty conduit systems carried in the electrical division
- Window treatments
- In-contract equipment and ICAT beyond that identified in this estimate
- Loose furniture, furnishings, equipment and ICAT
- Escalation contingency
- Value-added tax (e.g. Harmonized Sales Tax, Goods and Services Tax, or other)
- Unexpected labour unavailability and productivity disruptions leading to delays and added costs
- Supply chain disruptions leading to delays and added costs
- The allowance for investigations recommended in the pre-feasibility report to be performed to aid in the overall understanding of the structure and the reliability.
- **Any premiums resulting from Canadian Foreign government-imposed tariffs**

2. DOCUMENTATION

This Class D Estimate has been prepared from the documentation included in Appendix AA of this report.

All of the above documentation was received from J.L. Richards & Associates Limited and was supplemented with information gathered in meeting(s) and telephone conversations with the design team, as applicable.

Design changes and/or additions made subsequent to this issuance of the documentation noted above have not been incorporated in this report.

3. COST CONSIDERATIONS

3.1 COST BASE

All costs are estimated on the basis of competitive bids (a minimum of at least 3 general contractor bids and at least 3 subcontractor bids for each trade) being received in March 2025 from general contractors and all major subcontractors and suppliers based on a stipulated sum form of contract. If these conditions are not met, bids received could be expected to exceed this estimate.

3.2 UNIT RATES

The unit rates in the preparation of this Class D Estimate include labour and material, equipment, subcontractor's overheads and profit. Union contractors are assumed to perform the work with the fair wage policy in effect.

3.3 GENERAL REQUIREMENTS AND FEE

General Requirements and Fee cover the General Contractor's indirect costs, which may include but not be limited to supervision, site set up, temporary utilities, equipment, utilities, clean up, etc., as covered in Division 1 General Conditions of the Contract Documents. It also includes the contractor's fees and should not be confused with Design or Consultant fees, which are excluded from the Construction Costs and carried separately in the Owner's Total Project Costs.

3.4 DESIGN AND PRICING ALLOWANCE

An allowance of 15.0% has been included to cover design and pricing unknowns. This allowance is not intended to cover any program space modifications but rather to provide some flexibility for the designers and cost planners during the remaining contract document stages.

It is expected that this allowance amount will be absorbed into the base construction costs as the design advances. The amount by which this allowance is reduced corresponds to an increase in accuracy and detailed design information. Hanscomb recommends that careful consideration be made at each milestone estimate to maintain adequate contingency for this allowance.

As a project nears completion of design, Hanscomb recommends retaining some contingency for this allowance for the final coordination of documents.

3.5 ESCALATION ALLOWANCE

All costs are based on March 2025 dollars with no construction cost escalation included to cover increases that may occur between March 2025 and the undetermined construction start for the project.

The budgeted amount will typically decline as the time to award nears. If escalation is taken to the start of construction, escalation during construction is included in the unit rates. If escalation is taken to the midpoint of construction, it is because the market is volatile or the project is considerably large with a construction duration of more than 2-3 years, making it difficult to secure firm pricing at tender.

Forecasting escalation requires careful assessment of a continually changing construction market, which, at best, is difficult to predict. The escalation rate should be monitored.

3. COST CONSIDERATIONS

3.6 CONSTRUCTION ALLOWANCE

An allowance of 5.0% has been made to cover construction (post contract) unknowns. This allowance, also known as the Post Contract Contingency (PCC), is intended to cover costs for change orders during construction that are not foreseeable. It is not intended to cover scope changes to the contract. The amount carried in a budget for this allowance is typically set at the initial planning stage and should be based on the complexity of the project and the probability of unknowns and retained risks.

3.7 CASH ALLOWANCE

Cash allowances are intended to allow the contractor to include in the bid price the cost for work that is difficult to fully scope at the time of tendering based on factors that are beyond the Owner and Prime Consultant's control. Cash allowances attempt to reduce the risks by dedicating a set amount for use against a certain cost that cannot yet be detailed. The Contractor is obligated to work as best as possible within the limitations of the Cash Allowance.

Examples of Cash Allowances include hardware, inspection and testing, site conditions, replacement of existing elements during demolition for renovation, hazardous materials abatement, signage, etc.

Any Cash Allowances, if applicable, are included either in the details of this estimate under the appropriate discipline or at the summary level.

3.8 TAXES

No provision has been made for the Harmonized Sales Tax. It is recommended that the owner make separate provision for HST in the project budget.

3.9 SCHEDULE

Pricing assumes a standard work schedule appropriate to the size and scope of this project. Premiums for off-hour work, working in an operational facility, accelerated schedule, etc., if applicable, are identified separately in the body of the estimate.

3.10 CARBON QUANTIFICATION AND PRICING

The significance and understanding of carbon costs in construction is growing. These costs arise from two main sources: the ‘embodied’ carbon present in the materials and emitted during the construction activities, and the ‘operational’ carbon emissions resulting from the asset’s use over time. The unit rates in this estimate are inclusive of carbon taxes during construction where applicable. Evaluation of embodied carbon, operational carbon, and its costs is an additional service that can be provided on request.

3.11 STATEMENT OF PROBABLE COSTS

Hanscomb has no control over the cost of labour and materials, the contractor's method of determining prices, or competitive bidding and market conditions. This opinion of probable cost of construction is made on the basis of experience, qualifications and best judgment of the professional consultant familiar with the construction industry. Hanscomb cannot and does not guarantee that proposals, bids or actual construction costs will not vary from this or subsequent cost estimates.

3. COST CONSIDERATIONS

3.12 ONGOING COST CONTROL

Hanscomb recommends that the Owner and design team carefully review this document, including line item description, unit prices, clarifications, exclusions, inclusions and assumptions, contingencies, escalation, and mark-ups. If the project is over budget, or if there are unresolved budgeting issues, alternative systems/schemes should be evaluated before proceeding into the next design phase.

It is recommended that a final updated estimate at the end of the design stage be produced by Hanscomb using Bid Documents to determine overall cost changes which may have occurred since the preparation of this estimate. The final updated estimate will address changes and additions to the documents, as well as addenda issued during the bidding process. Hanscomb cannot reconcile bid results to any estimate not produced from bid documents, including all addenda.

This estimate does not constitute an offer to undertake the work, nor is any guarantee given that an offer to undertake the work at the estimate(s) price will subsequently be submitted by a construction contractor. Unless explicitly stated otherwise, it is assumed that competitive bids will be sought when tender documents have been completed. Any significant deviation between bids received and a pre-tender estimate prepared by Hanscomb from the same tender documents should be evaluated to establish the possible cause(s).

3.13 CURRENT RISKS TO CONSTRUCTION ESCALATION:

The construction market is relatively heated across the country. Because of the significant volume of activity, Hanscomb has observed that the normal number of general contractors and sub-trades bidding on projects has been reduced. Less competition during tendering often results in elevated project pricing. We expect this trend to continue for the following reasons:

- The volume of work exceeds the capacity of available resources
- An aging workforce contributes to pressure through the ever-increasing retirement of trade workers
- All members within the construction community are actively looking for new personnel and are having trouble finding qualified candidates
- Contractors are generally competing for the same tradespeople, offering higher than normal salaries and benefits, translating into higher costs
- Global conflicts affecting the global commodity pricing and supply chain

The above risks may be amplified under the following conditions:

- Mega projects that are experiencing limited to no competition with fewer contractors and major subtrades capable of handling the work or acquiring appropriate bonding and insurance
- Any premiums resulting from Canadian or Foreign government-imposed tariffs.
- Global events, including pandemics such as COVID-19, adverse weather events, etc.
- South-Eastern Ontario and Maritime projects, where general contractors and subtrades from Quebec that traditionally bid projects in the area are not participating because they are also experiencing an active market
- Remote or less densely populated areas where materials and labour cannot be sourced locally and transportation, accommodation and incentives impact schedule and cost

Where any of the above may be a factor, Hanscomb highly recommends conducting appropriate risk analyses, including market sounding. Hanscomb can assist; however, this level of risk assessment is outside the scope of this estimate.

4. GROSS FLOOR AND SITE DEVELOPED AREAS

The following areas have been measured in accordance with the Canadian Institute of Quantity Surveyors' Measurement of Buildings by Area and Volume.

4.1 GROSS FLOOR AREA (GFA)

Description	Area (m2)
Arena	
Level 1	2,500
Level 2	737
Shed	45
Total GFA	**3,282**

5. CONSTRUCTION COST ESTIMATE SUMMARY

Description	Quantity		Rate	Amount
New Construction	3,282	m2	2,992.60	$9,821,700
Site Development	1	Sum		$407,900
Demolition & Alterations	1	Sum		$1,340,800
Sub-total	3,282	m2	3,525.41	$11,570,400
General Requirements	15.0%			$1,735,600
Fee	5.0%			$665,300
Sub-total	3,282	m2	4,256.95	$13,971,300
Design & Pricing Allowance	15.0%			$2,095,700
Escalation Allowance	0.0%			$0
Total Construction Cost	**3,282**	**m2**	**4,895.49**	**$16,067,000**
Construction Allowance	5.0%			$803,400
Total + Construction Allowance	3,282	m2	5,140.28	$16,870,400

6. UNDERSTANDING THE ELEMENTAL COST SUMMARY

Cost information prepared and presented by Quantity Surveyors is often organized in a form referred to as the 'Elemental Cost Summary'. In this format, the more 'intuitive' building elements (e.g. foundations, exterior cladding, plumbing, etc.) are evaluated rather than materials or trades. Quantity Surveyors track this information consistently from project to project to benchmark not just the overall building unit rate but also rates and ratios for key elements. Below are some key features of the Elementary Cost Summary.

Building components are summarized as elements 'A2 Structure' and then sub-elements 'A23 Roof Construction'. This allows review of Roof Construction costs whether it is steel, concrete or wood - something difficult with a trade summary.

Ratio to GFA evaluates design efficiency and highlights outliers. It is arrived at by dividing the parametric quantity of a sub-element (i.e. overall exterior wall area) by the building gross floor area (GFA). A ratio greater than 0.600 for 'A32 Walls Above Grade' is considered high and may be due to articulation, courtyard design or high floor to floor heights.

The 'Unit Rate' is the blended rate of a sub-element's costs divided by its parametric quantity and allows a review of its reasonableness relative to benchmarks. A rate of $559/m2 indicates a good quality exterior wall cladding.

The last column expresses the cost of each element as a percentage of total construction cost. At 18.7% of total construction costs, mechanical and electrical systems are considered basic.

The 'Rate per SF' (m^2) column converts costs for each element or sub-element to a $/SF ($m^2$) of GFA for comparison to benchmark rates. A rate of $217/$m^2$ indicates basic electrical design.

General Requirements & Fee cover General Contractor's overheads (site set up, supervision, etc.) and contractor's expenses. Fee is not for Consultants.

Allowances are critical for estimates. Design & pricing compensates for a lack of detail early in design; escalation considers changes to labour & material; construction allowance is for unforeseen conditions; and, cash allowances offer flexibility for items difficult to detail at bid.

Project :
Location :
Owner :
Consultant :

SAMPLE ELEMENTAL SUMMARY

Report date : 19 Jul 2017
Page No. : A - 1
Bldg Type : 420
C.T. Index : 0.0
GFA : 1,582 m2

Element	Ratio to GFA	Elemental Cost Quantity	Unit Rate	Elemental Amount Sub-Total	Total	Rate per m2 Sub-Total	Total	%
A SHELL		1,582 m2			1,829,900		1,156.70	35.6
A1 SUBSTRUCTURE					250,000		158.03	4.9
A11 Foundations	1.000	1,582 m2	158.03	250,000		158.03		
A12 Basement Excavation	0.001	1 Nil	0.00	0		0.00		
A13 Special Conditions	0.001	1 Sum	0.00	0		0.00		
A2 STRUCTURE					468,800		296.33	9.1
A21 Lowest Floor Construction	1.000	1,582 m2	64.92	102,700		64.92		
A23 Roof Construction		1 Nil	0.00	0		0.00		
A23 Roof Construction	1.013	1,602 m2	228.53	366,100		231.42		
A3 EXTERIOR ENCLOSURE					1,111,100		702.34	21.6
A31 Walls Below Grade	0.001	1 Nil	0.00	0		0.00		
A32 Walls Above Grade		1,096 m2	**559.22**	612,900		387.42		
A33 Windows & Entrances	0.003	4 Lvs	3,275.00	13,100		8.28		
A34 Roof Coverings	1.013	1,602 m2	220.22	352,800		223.01		
A35 Projections	1.000	1,582 m2	83.63	132,300		83.63		
B INTERIORS		1,582 m2			1,033,400		653.22	20.1
B1 PARTITIONS & DOORS					382,900		242.04	7.4
B11 Partitions	1.504	2,380 m2	105.29	250,600		158.41		
B12 Doors	0.038	60 Lvs	2,205.00	132,300		83.63		
B2 FINISHES					398,400		251.83	7.7
B21 Floor Finishes	1.000	1,582 m2	75.35	119,200		75.35		
B22 Ceiling Finishes	1.000	1,582 m2	91.28	144,400		91.28		
B23 Wall Finishes	2.314	3,660 m2	36.83	134,800		85.21		
B3 FITTINGS & EQUIPMENT					252,100		159.36	4.9
B31 Fittings & Fixtures	1.000	1,582 m2	159.36	252,100		159.36		
B32 Equipment	1.000	1,582 m2	0.00	0		0.00		
B33 Elevators	0.001	1 Nil	0.00	0		0.00		
B34 Escalators	0.001	1 Nil	0.00	0		0.00		
C SERVICES		1,582 m2			964,400		609.61	**18.7**
C1 MECHANICAL					621,100		392.60	12.1
C11 Plumbing & Drainage	1.000	1,582 m2	145.26	229,800		145.26		
C12 Fire Protection	1.000	1,582 m2	31.04	49,100		31.04		
C13 HVAC	1.000	1,582 m2	170.35	269,500		170.35		
C14 Controls	1.000	1,582 m2	45.95	72,700		45.95		
C2 ELECTRICAL					343,300		**217.00**	6.7
C21 Service & Distribution	1.000	1,582 m2	42.54	67,300		42.54		
C22 Lighting, Devices & Heating	1.000	1,582 m2	116.81	184,800		116.81		
C23 Systems & Ancillaries	1.000	1,582 m2	57.65	91,200		57.65		
NET BUILDING COST - EXCLUDING SITE					**$ 3,827,700**		2,419.53	74.4
D SITE & ANCILLARY WORK		1,582 m2			799,800		505.56	15.5
D1 SITE WORK					799,800		505.56	15.5
D11 Site Development	6.541	10,348 m2	48.71	504,100		318.65		
D12 Mechanical Site Services	0.001	1 Sum	167,400.00	167,400		105.82		
D13 Electrical Site Services	0.001	1 Sum	128,300.00	128,300		81.10		
D2 ANCILLARY WORK					0		0.00	0.0
D21 Demolitions	0.001	1 Nil	0.00	0		0.00		
D22 Alterations	0.001	1 Nil	0.00	0		0.00		
NET BUILDING COST - INCLUDING SITE					**$ 4,627,500**		2,925.09	89.9
Z1 GENERAL REQUIREMENTS & FEE					520,100		328.76	10.1
Z11 General Requirements		**8.0%**		370,200		234.01		
Z12 Fee		**3.0%**		149,900		94.75		
TOTAL CONSTRUCTION ESTIMATE - EXCLUDING ALLOWANCES				**$ 5,147,600**		3,253.86	100.0	
Z2 ALLOWANCES					930,500		588.18	
Z21 Design & Pricing Allowance		**10.0%**		514,800		325.41		
Z22 Escalation Allowance		**2.5%**		141,600		89.51		
Z23 Construction Allowance		**3.0%**		174,100		110.05		
Z24 Cash Allowances		**1 Sum**	100,000.00	100,000		63.21		
TOTAL CONSTRUCTION ESTIMATE - INCLUDING ALLOWANCES				**$ 6,078,100**		3,842.04		
VALUE ADDED TAX (GST/HST)					0		0.00	
Value Added Tax (GST/HST)		0.0 %		0		0.00		
TOTAL CONSTRUCTION ESTIMATE				**$ 6,078,100**		**$ 3,842.04**		

J2351 -Z1 CLASS C ESTIMATE Hanscomb QUANTITY SURVEYORS

By using this format consistently across all projects, Quantity Surveyors can compare projects and better understand why the 'roof covering' element may be more on this project if it's fulfilling the same function as a similar project.

Note: The above sample is based on the CIQS Elemental format. The fundamental principles of reading the information are the same for summaries reported based on UNIFORMAT.

Appendix
A - Detailed Elemental Estimate

Project	: **Shawville Arena**			Report date	: 28 Mar 2025
	: **Pre-feasibility**			Page No.	: A - 1
Location	: **Shawville, QC**	**ELEMENTAL COST SUMMARY**		Bldg Type	: 550
Owner	: **Municipality of Shawville**			C.T. Index	: 0.0
Consultant	: **J.L. Richards & Associates Limited**			GFA	: 3,282 m2

Element	Ratio to GFA	Elemental Cost		Elemental Amount		Rate per m2		%
		Quantity	Unit rate	Sub-Total	Total	Sub-Total	Total	
A SHELL		3,282 m2			3,806,800		1,159.90	27.3
A1 SUBSTRUCTURE					30,000		9.14	0.2
A11 Foundations	0.000	1 Sum	30,000.00	30,000		9.14		
A12 Basement Excavation				0		0.00		
A13 Special Conditions				0		0.00		
A2 STRUCTURE					2,258,200		688.06	16.2
A21 Lowest Floor Construction	0.610	2,006 m2	607.00	1,216,800		370.75		
A22 Upper Floor Construction	0.160	514 m2	409.00	210,100		64.02		
A23 Roof Construction	0.750	2,462 m2	338.00	831,300		253.29		
A3 EXTERIOR ENCLOSURE					1,518,600		462.71	10.9
A31 Walls Below Grade				0		0.00		
A32 Walls Above Grade	0.460	1,506 m2	589.00	887,100		270.29		
A33 Windows & Entrances	0.020	56 m2	2,589.00	145,000		44.18		
A34 Roof Coverings	0.760	2,500 m2	155.00	387,500		118.07		
A35 Projections	0.000	1 Sum	99,000.00	99,000		30.16		
B INTERIORS		3,282 m2			1,934,400		589.40	13.9
B1 PARTITIONS & DOORS					732,000		223.03	5.2
B11 Partitions	0.000	1 Sum	388,500.00	388,500		118.37		
B12 Doors	0.010	48 No	7,156.00	343,500		104.66		
B2 FINISHES					322,400		98.23	2.3
B21 Floor Finishes	0.340	1,101 m2	126.00	138,500		42.20		
B22 Ceiling Finishes	0.230	771 m2	102.00	78,400		23.89		
B23 Wall Finishes	0.620	2,038 m2	52.00	105,500		32.15		
B3 FITTINGS & EQUIPMENT					880,000		268.13	6.3
B31 Fittings & Fixtures	1.000	3,282 m2	14.00	45,000		13.71		
B32 Equipment	1.000	3,282 m2	209.00	685,000		208.71		
B33 Elevators	0.000	1 No	150,000.00	150,000		45.70		
B34 Escalators				0		0.00		
C SERVICES		3,282 m2			4,080,500		1,243.30	29.2
C1 MECHANICAL					3,030,600		923.40	21.7
C11 Plumbing & Drainage	1.000	3,282 m2	54.00	178,700		54.45		
C12 Fire Protection	1.000	3,282 m2	46.00	150,100		45.73		
C13 HVAC	1.000	3,282 m2	775.00	2,543,400		774.95		
C14 Controls	1.000	3,282 m2	48.00	158,400		48.26		
C2 ELECTRICAL					1,049,900		319.90	7.5
C21 Service & Distribution	1.000	3,282 m2	97.00	317,000		96.59		
C22 Lighting, Devices & Heating	1.000	3,282 m2	161.00	528,000		160.88		
C23 Systems & Ancillaries	1.000	3,282 m2	62.00	204,900		62.43		
NET BUILDING COST - EXCLUDING SITE				**$**	**9,821,700**		2,992.60	70.3
D SITE & ANCILLARY WORK		3,282 m2			1,748,700		532.82	12.5
D1 Site Services					407,900		124.28	2.9
D11 Site Development	0.000	1 Sum	200,900.00	200,900		61.21		
D12 Mechanical Site Services	0.000	1	187,000.00	187,000		56.98		
D13 Electrical Site Services	0.000	1 Sum	20,000.00	20,000		6.09		
D2 ANCILLARY WORK					1,340,800		408.53	9.6
D21 Demolitions	0.000	1 Sum	1,340,800.00	1,340,800		408.53		
D22 Alterations				0		0.00		
NET BUILDING COST - INCLUDING SITE				**$**	**11,570,400**		3,525.41	82.8
Z1 GENERAL REQUIREMENTS & FEE					2,400,900		731.54	17.2
Z11 General Requirements		15.0 %		1,735,600		528.82		
Z12 Fee		5.0 %		665,300		202.71		
TOTAL CONSTRUCTION ESTIMATE - EXCLUDING ALLOWANCES				**$**	**13,971,300**		4,256.95	100.0
Z2 ALLOWANCES					2,899,100		883.33	
Z21 Design & Pricing Allowance		15.0 %		2,095,700		638.54		
Z22 Escalation Allowance		0.0 %		0		0.00		
Z23 Construction Allowance		5.0 %		803,400		244.79		
TOTAL CONSTRUCTION ESTIMATE - INCLUDING ALLOWANCES				**$**	**16,870,400**		5,140.28	
VALUE ADDED TAX (GST/HST)					0		0.00	
Value Added Tax (GST/HST)		0.0 %		0		0.00		
TOTAL CONSTRUCTION ESTIMATE				**$**	**16,870,400**	**$**	**5,140.28**	

A1 SUBSTRUCTURE	Quantity	Unit rate	Amount
A11 Foundations			
1 Repair the concrete piers, including chipping and exposing reinforcing steel for the first foot and reinstating the concrete	20 no.	500.00	10,000
2 Allowance for foundations, excavation and backfill for the elevator		allow	20,000
A11 Foundations **TOTAL : $**	1 Sum	30,000.00	30,000

A2 STRUCTURE		Quantity	Unit rate	Amount
A21 Lowest Floor Construction				
Rink structure				
1 Rink ice slab, 400mm thick		1,401 m2	516.60	723,800
2 Rink perimeter slab, 150mm thick		605 m2	157.90	95,500
3 Haunch, 800mm		150 m	150.00	22,500
4 Dasher board		150 m	2,500.00	375,000
A21 Lowest Floor Construction	**TOTAL : $**	2,006 m2	606.58	1,216,800
A22 Upper Floor Construction				
1 Concrete floor construction, 150mm thick		514 m2	408.80	210,100
A22 Upper Floor Construction	**TOTAL : $**	514 m2	408.75	210,100
A23 Roof Construction				
1 Rust cleaning, surface prepped and coated c/w zinc rich coating to beam, column, purlins and girts		2,462 m2	250.00	615,500
2 Allowance for roof construction of the elevator			allow	7,500
3 New steel girts		753 m2	250.00	188,300
4 Allowance for temporary support to the girt construction		1 sum	20,000.00	20,000
A23 Roof Construction	**TOTAL : $**	2,462 m2	337.65	831,300

A3 EXTERIOR ENCLOSURE	Quantity	Unit rate	Amount
A32 Walls Above Grade			
1 Exterior wall cladding replacement	1,506 m2	250.00	376,500
2 Extra over for new insulation to above	1,506 m2	100.00	150,600
3 Allowance for shear wall of the elevator		allow	45,000
4 Allowance for the exterior cladding to shear walls of the elevator		allow	15,000
5 Allowance for scaffolding (assume 24 weeks)	1 sum	300,000.00	300,000
A32 Walls Above Grade **TOTAL : $**	1,506 m2	589.04	887,100
A33 Windows & Entrances			
1 Aluminum double-glazed windows	8 m2	1,575.00	12,600
2 Glazed aluminum door c/w aluminum frame and standard hardware	4 no.	6,700.00	26,800
3 Aluminum door c/w aluminum frame and standard hardware	10 no.	5,820.00	58,200
4 Allowance for hardware upgrade to above doors	14 no.	600.00	8,400
5 Allowance for push button door operator	6 no.	4,000.00	24,000
6 Allowance for new aluminum louvre	1 sum	15,000.00	15,000
A33 Windows & Entrances **TOTAL : $**	56 m2	2,589.29	145,000

A3 EXTERIOR ENCLOSURE		Quantity	Unit rate	Amount
A34 Roof Coverings				
1 New insulation to the existing roof covering (measure flat on plan)		2,500 m2	155.00	387,500
A34 Roof Coverings	**TOTAL : $**	2,500 m2	155.00	387,500
A35 Projections				
1 Allowance for new steel platform and stair			allow	75,000
2 Surface prepped and re-coated to existing exterior structure		45 m2	100.00	4,500
3 New insulation to shed		45 m2	155.00	7,000
4 Canopy cladding replacement		1 sum	2,500.00	2,500
5 Allowance for ramps and barrier free elements to the vestibule area			allow	10,000
A35 Projections	**TOTAL : $**	1 Sum	99,000.00	99,000

B1 PARTITIONS & DOORS	Quantity	Unit rate	Amount
B11 Partitions			
1 Allowance for partitions of barrier-free showers and water closets within dressing room, including wall finishes	4 no.	10,000.00	40,000
2 Interior partition, 1FRR (Assume)	723 m2	354.90	256,600
3 Internal glazing, double glazed	52 m2	1,575.00	81,900
4 Allowance for wood blocking, backing and rough carpentry		allow	5,000
5 Allowance for fire stopping, sealant and caulking		allow	5,000
B11 Partitions **TOTAL : $**	1 Sum	388,500.00	388,500
B12 Doors			
1 Glazed aluminum door c/w alumimum frame and standard hardware	6 no.	6,700.00	40,200
2 Glazed wood door, 45min. FRR	2 no.	4,750.00	9,500
3 Glazed timber door c/w wood frame and standard hardware	4 no.	4,000.00	16,000
4 Hollow metal door c/w steel frame and standard hardware	5 no.	3,000.00	15,000
5 Solid timber door c/w wood frame and standard hardware	31 no.	3,419.40	106,000
6 Allowance for hardware upgrade	48 no.	600.00	28,800
7 Allowance for push buttom door operators to 2/3 doors above	32 no.	4,000.00	128,000
B12 Doors **TOTAL : $**	48 No	7,156.25	343,500

B2 FINISHES		Quantity	Unit rate	Amount
B21 Floor Finishes				
1 Carpet		23 m2	125.00	2,900
2 Ceramic tiles		45 m2	170.00	7,700
3 Dressing room flooring		137 m2	125.00	17,100
4 Sealed concrete		68 m2	30.00	2,000
5 Flooring paint		143 m2	35.00	5,000
6 Non-slip flooring		3 m2	150.00	500
7 Rubber flooring		300 m2	150.00	45,000
8 Vinyl flooring		374 m2	125.00	46,800
9 Wood tiles		8 m2	95.00	800
10 Rubber base		534 m	20.00	10,700
B21 Floor Finishes	**TOTAL : $**	1,101 m2	125.79	138,500
B22 Ceiling Finishes				
1 Gypsum board ceiling panel, 1hr FRR		372 m2	80.00	29,800
2 Gypsum board ceiling panel, 1hr FRR to ex. grid		42 m2	65.00	2,700
3 Gypsum board ceiling c/w paint		346 m2	100.00	34,600
4 Ceiling assembly		19 m2	594.70	11,300
B22 Ceiling Finishes	**TOTAL : $**	771 m2	101.69	78,400

B2 FINISHES		Quantity	Unit rate	Amount
B23 Wall Finishes				
1	Wall finishes to barrier-free showers and water closets within the dressing rooms		Inclu	
2	Allowance for wall paint to shear walls of the elevator		allow	2,000
3	Wall paint	1,800 m2	35.00	63,000
4	Ceramic tile	238 m2	170.00	40,500
B23 Wall Finishes	**TOTAL : $**	2,038 m2	51.77	105,500

B3 FITTINGS & EQUIPMENT	Quantity	Unit rate	Amount
B31 Fittings & Fixtures			
1 Allowance for accessories of barrier-free showers and water closets within the dressing room	4 no.	5,000.00	20,000
2 Allowance for dedicated wheel chair space	10 no.	2,500.00	25,000
B31 Fittings & Fixtures **TOTAL : $**	3,282 m2	13.71	45,000
B32 Equipment			
1 Allowance for steel bleachers	440 m2	1,500.00	660,000
2 Extra over for bleacher barrier	25 m	1,000.00	25,000
B32 Equipment **TOTAL : $**	3,282 m2	208.71	685,000
B33 Elevators			
1 Elevator	1 no.	150,000.00	150,000
B33 Elevators **TOTAL : $**	1 No	150,000.00	150,000

C1 MECHANICAL		Quantity	Unit rate	Amount
C11 Plumbing & Drainage				
	Plumbing Equipment			
1	Water meter	2 no	5,000.00	10,000
2	Backflow preventer	2 no	3,500.00	7,000
3	Electric DHW, 251,000btu/hr	1 no	25,000.00	25,000
4	Electric DHW, 270,000btu/hr	1 no	27,000.00	27,000
5	Electric DHW, 360,000btu/hr	1 no	36,000.00	36,000
6	Electric DHW, 10,000btu/hr	1 no	4,000.00	4,000
7	Allowance for circulation and recirculation p umps	1 Sum	7,000.00	7,000
	Plumbing Fixtures			
8	Water closet	7 no	2,300.00	16,100
9	Lavatory	6 no	1,800.00	10,800
10	Double basin sink	3 no	2,400.00	7,200
11	Mop sink	2 no	2,000.00	4,000
12	Urinal	2 no	2,300.00	4,600
13	allowance for rough-ins	20 no	1,000.00	20,000
C11 Plumbing & Drainage	**TOTAL : $**	3,282 m2	54.45	178,700
C12 Fire Protection				
1	Allowance for relocation of sprinkler heads	3,282 m2	45.00	147,700
2	Allowance for fire extinguishers	1 Sum	2,400.00	2,400
C12 Fire Protection	**TOTAL : $**	3,282 m2	45.73	150,100

C1 MECHANICAL		Quantity	Unit rate	Amount
C13	HVAC			
	Air Handling Equipment			
1	ERVs, 1,000 L/s	3 no.	53,000.00	159,000
2	Silica gel-type 3HP dehumidifier, 120,000btu/ hr	1 no	30,000.00	30,000
	Heating/Cooling Equipment			
3	Heat pump and electric resistive backup heat - included in ERV		nil	
4	Ammonia refrigerant system for ice rink	1 Sum	1,100,000.00	1,100,000
5	Compressors, 2		Inclu	
6	Evaporator		Inclu	
7	Accumulator barrels		Inclu	
8	Oil separators		Inclu	
9	Brine tank c/w pump		Inclu	
10	Cooling tower tank c/w dedicated pump		Inclu	
11	Motors		Inclu	
	Piping, Valves & Accessories			
12	Allowance for brine piping	1 Sum	560,000.00	560,000
13	Allowance for brine piping headers	1 Sum	5,100.00	5,100
14	Allowance for brine piping accessories	1 Sum	65,000.00	65,000
15	Allowance for steel piping for ammonia system	1 Sum	150,000.00	150,000
			Carried Forward :	2,069,100

C1 MECHANICAL		Quantity	Unit rate	Amount
C13 HVAC (Continued)			**Brought Forward :**	2,069,100
Ductwork and Air Distribution				
16 Allowance for ducting c/w insulation		1 sum	288,000.00	288,000
17 Allowance for exhaust fans for furnace rooms		2 no	5,000.00	10,000
18 Allowance for exhaust hood c/w fire suppressi on		1 Sum	16,000.00	16,000
Heating Devices				
19 Electric radiant heaters		4 no	6,250.00	25,000
20 Electric heater for Zamboni room		1 no	1,800.00	1,800
21 Electric heater for for referee room		1 no	1,500.00	1,500
22 Electric heater for ammonia room		1 no	6,000.00	6,000
23 Electric heater for VIP box		1 no	2,500.00	2,500
Miscellaneous				
24 HVAC miscellaneous such as startup, cleaning, drawings, manual, tagging, identification		1 Sum	50,000.00	50,000
25 HVAC unidentified items		1 Sum	50,000.00	50,000
26 Testing, adjusting & balancing		1 Sum	23,500.00	23,500
C13 HVAC	**TOTAL : $**	3,282 m2	774.95	2,543,400
C14 Controls				
BAS System				
1 Ammonia refrigerant system		1 Sum	50,000.00	50,000
2 Dehumidifier		2 no	5,000.00	10,000
3 Furnace		1 no	3,000.00	3,000
			Carried Forward :	63,000

C1 MECHANICAL		Quantity	Unit rate	Amount
C14 Controls	(Continued)		**Brought Forward :**	63,000
4 Exhaust fan		4 no	1,000.00	4,000
5 Domestic hot water heaters		5 no	1,200.00	6,000
6 T-stats		12 no	750.00	9,000
7 Programming		1 Sum	50,000.00	50,000
Demolition				
8 Ammonia refrigerant system		1 Sum	15,000.00	15,000
9 Dehumidifier		1 Sum	1,000.00	1,000
10 Furnace		1 no	600.00	600
11 Exhaust fan		4 no	500.00	2,000
12 Domestic hot water heaters		5 no	600.00	3,000
13 T-stat		12 no	400.00	4,800
C14 Controls	**TOTAL : $**	3,282 m2	48.26	158,400

C2 ELECTRICAL		Quantity	Unit rate	Amount
C21 Service & Distribution				
1 Service & distribution		1 sum	267,000.00	267,000
2 Electrical misc.		1 sum	50,000.00	50,000
C21 Service & Distribution	**TOTAL : $**	3,282 m2	96.59	317,000
C22 Lighting, Devices & Heating				
1 Supply, install & wire lighting fixtures		3,282 m2	100.00	328,200
2 Exit & emergency lighting		3,282 m2	4.90	16,000
3 Lighting controls, LV		3,282 m2	17.10	56,200
4 Power outlets, devices & connections		3,282 m2	25.00	82,100
5 Connections to mechanical equipment		1 sum	35,000.00	35,000
6 Electric heating		1 sum	10,520.00	10,500
C22 Lighting, Devices & Heating	**TOTAL : $**	3,282 m2	160.88	528,000
C23 Systems & Ancillaries				
1 FA system c/w wiring in conduits, T & V etc		3,282 m2	35.00	114,900
2 Communication system - empty conduit system		1 sum	46,000.00	46,000
3 Security system - empty conduit system		1 sum	20,000.00	20,000
4 PA system - empty conduit system		1 sum	12,000.00	12,000
5 A/V system - empty conduit system		1 sum	12,000.00	12,000
C23 Systems & Ancillaries	**TOTAL : $**	3,282 m2	62.43	204,900

D1 Site Services		Quantity	Unit rate	Amount
D11 Site Development				
1 Allowance for builders' works associated with water servicing, sanitary servicing and stormwater servicing			allow	30,000
2 New reinfoced concrete pad		36 m2	450.00	16,200
3 Extra over for fence to the above exterior reinforced conctete pad		42 m	350.00	14,700
4 Re-grading		2,000 m2	20.00	40,000
5 Top soil and seeding		1,000 m2	100.00	100,000
D11 Site Development	**TOTAL : $**	1 Sum	200,900.00	200,900
D12 Mechanical Site Services				
Oil Tanks, Assumed not rented				
1 Propane tank, 3788L		1 no	17,000.00	17,000
2 Propane tank, 375L		7 no	3,000.00	21,000
3 Oil tank, 2200l		1 no	10,000.00	10,000
4 Redirect improperly connected floor drains to sanitary system		1 sum	19,000.00	19,000
5 Replace undersized perforated pipe system		300 m	200.00	60,000
6 Allowance to loop arena watermain to the other watermain		1 sum	60,000.00	60,000
D12 Mechanical Site Services	**TOTAL : $**	1	187,000.00	187,000

D1 Site Services		Quantity	Unit rate	Amount
D13 Electrical Site Services				
1 Allowance for new secondary power service		1 sum	10,000.00	10,000
2 Allowance for new incoming communications		1 sum	5,000.00	5,000
3 Allowance for any other services		1 sum	5,000.00	5,000
D13 Electrical Site Services	**TOTAL : $**	1 Sum	20,000.00	20,000

D2 ANCILLARY WORK		Quantity	Unit rate	Amount
D21	Demolitions			
1	Remove the existing second floor construction, wood joist and plywood	514 m2	100.00	51,400
2	Remove existing ceiling finishes	796 m2	50.00	39,800
3	Remove existing wood bleachers	440 m2	75.00	33,000
4	Remove existing wood partition	723 m2	50.00	36,200
5	Remove existing exterior cladding	1,542 m2	50.00	77,100
6	Remove the existing windows	60 m2	100.00	6,000
7	Remove existing louvres	1 sum	4,000.00	4,000
8	Remove and reinstate the existing roof covering	2,545 m2	150.00	381,800
9	Remove the existing floor finishes	1,101 m2	30.00	33,000
10	Remove the existing wall finishes	2,000 m2	30.00	60,000
11	Remove the rink ice slab	1,401 m2	100.00	140,100
12	Remove the rink perimeter slab	605 m2	100.00	60,500
13	Remove the dasher board	150 m	100.00	15,000
	Demolition (Plumbing & Drainage)			
14	Plumbing fixtures	20 no	500.00	10,000
15	Plumbing piping	1 Sum	10,000.00	10,000
16	Removal of propane hot water tanks	3 no	6,000.00	18,000
17	Removal of electric hot water tanks	2 no	500.00	1,000
			Carried Forward :	976,900

D2 ANCILLARY WORK		Quantity	Unit rate	Amount
D21 Demolitions (Continued)			**Brought Forward :**	976,900
Demolition (HVAC)				
18 Ducting		1 Sum	20,000.00	20,000
19 Dehumidifiers		1 Sum	1,500.00	1,500
20 Furnace		1 no	2,000.00	2,000
21 Ammonia refrigeration system		1 Sum	60,000.00	60,000
22 Piping		1 Sum	150,000.00	150,000
23 Heating devices		1 Sum	2,000.00	2,000
24 Exhaust fans		4 no.	500.00	2,000
25 AC units in community room		2 no.	500.00	1,000
Demolition (Controls)				
26 Ammonia refrigerant system		1 Sum	15,000.00	15,000
27 Dehumidifier		1 Sum	1,000.00	1,000
28 Furnace		1 no	600.00	600
29 Exhaust fan		4 no	500.00	2,000
30 Domestic hot water heaters		5 no	600.00	3,000
31 T-stat		12 no	400.00	4,800
32 S & D - Demolitions		1 sum	23,000.00	23,000
33 L, D & H - Demolitions		1 sum	15,000.00	15,000
34 Systems - Demolitions		1 sum	12,130.00	12,100
Demolition (Mechanical Site Services)				
35 Removal of tanks		9 no	2,100.00	18,900
36 Demolition of fuel piping		1 sum	30,000.00	30,000
D21 Demolitions	**TOTAL : $**	1 Sum	1,340,800.00	1,340,800

Appendix
AA - Documents and Drawings List

DOCUMENTS AND DRAWING LIST

DOCUMENTS

Number	Title	Dated	Received
N/A	32824-000 Shawville Arena Pre-Feasibility Report DRAFT	Mar. 06/25	Mar. 07/25
N/A	32824-000 Shawville Arena - Limited Building Condition Assessment and Summary of Systems	Nov. 20/24	Mar. 03/25

ARCHITECTURAL DRAWINGS

Number	Title	Dated	Received
N/A	Cover Page	Feb. 03/25	Mar. 03/25
GA01	Level 1 Plan	Feb. 03/25	Mar. 03/25
GA02	Level 2 Plan	Feb. 03/25	Mar. 03/25
GA03	Sections	Feb. 03/25	Mar. 03/25

STRUCTURAL DRAWINGS

Number	Title	Dated	Received
N/A	Not Applicable	N/A	N/A

MECHANICAL DRAWINGS

Number	Title	Dated	Received
N/A	Not Applicable	N/A	N/A

DOCUMENTS AND DRAWING LIST

ELECTRICAL DRAWINGS

Number	Title	Dated	Received
N/A	Not Applicable	N/A	N/A

CIVIL DRAWINGS

Number	Title	Dated	Received
N/A	Not Applicable	N/A	N/A

LANDSCAPE DRAWINGS

Number	Title	Dated	Received
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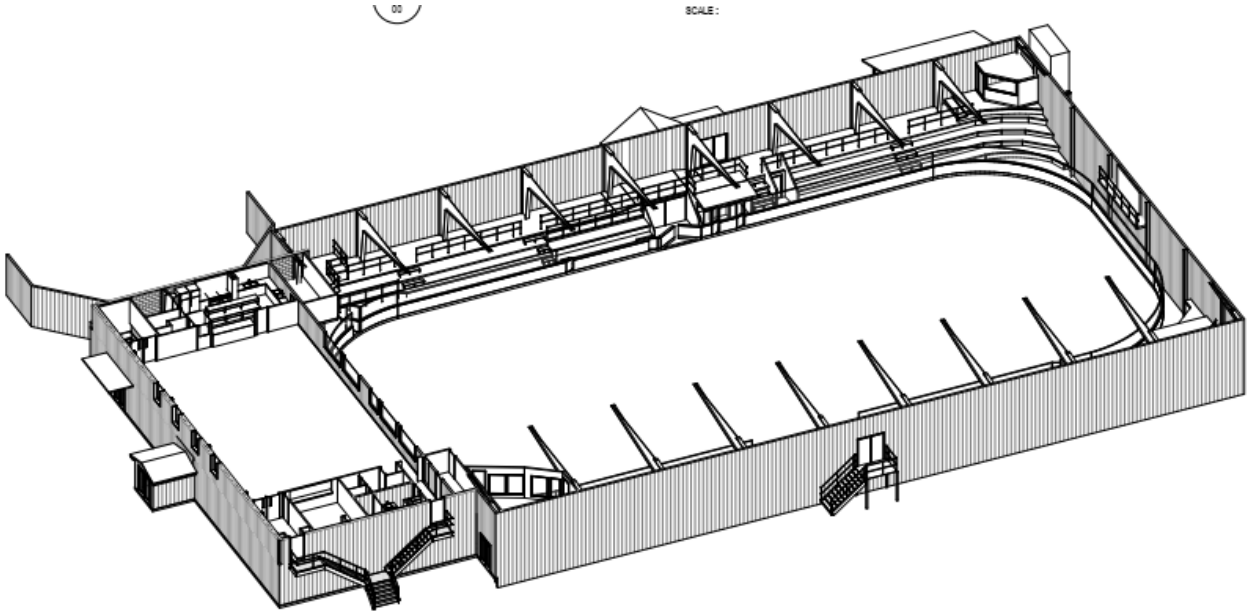
Appendix
AB - Representative Drawings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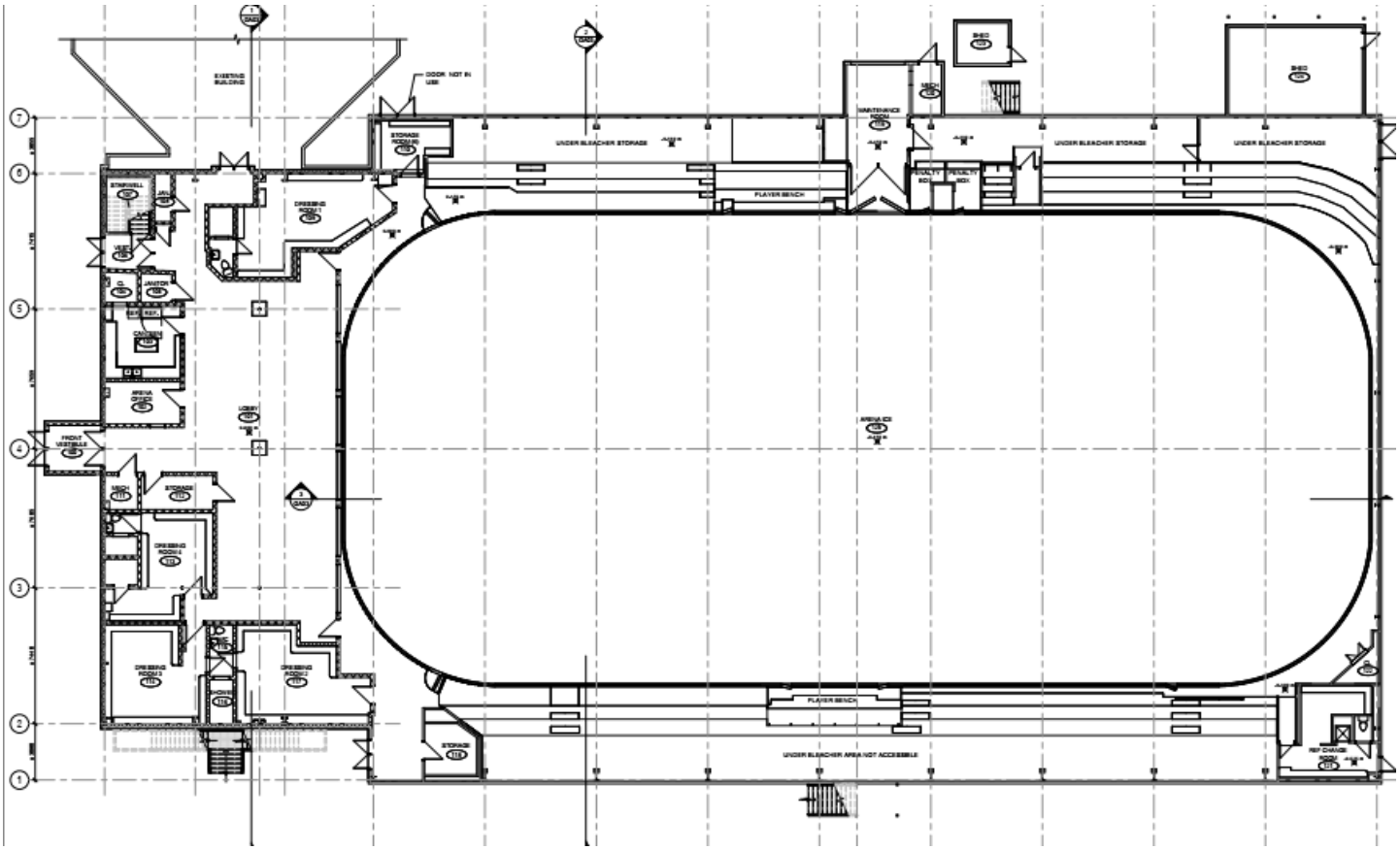
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UNDER BLEACHER STORAGE
MAINTENANCE ROOM 108
UNDER BLEACHER STORAGE
UNDER BLEACHER STORAGE
PLAYER BENCH
DRESSING ROOM 1 101
STAIRWELL 100
JANITOR 105
REF 104
OFFICE 103
ARENA 102
FRONT VESTIBULE 100
MECH 111
STORAGE 110
DRESSING ROOM 4 114
DRESSING ROOM 3 113
DRESSING ROOM 2 112
STORAGE 115
ARENA ICE
PLAYER BENCH
UNDER BLEACHER AREA NOT ACCESSIBLE
REF CHANGE ROOM 116

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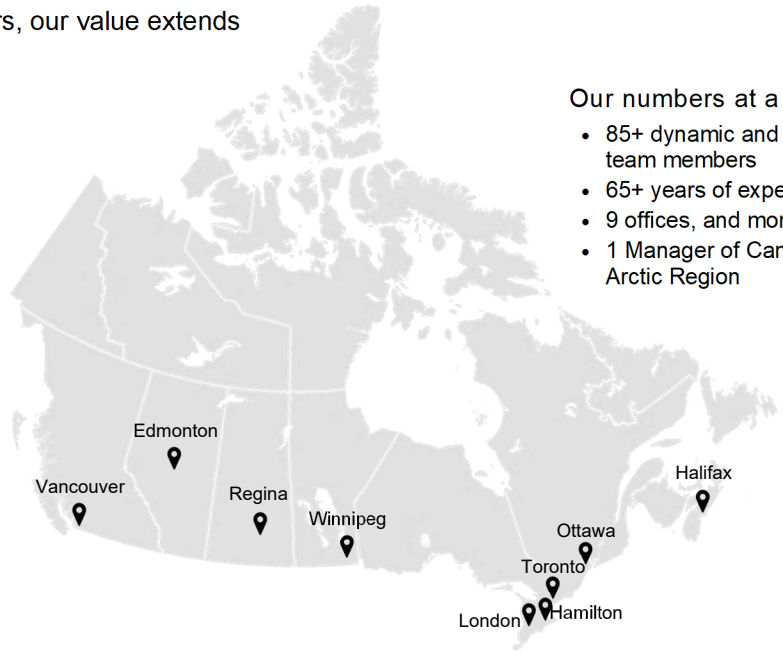
Applied Research
- Construction price indexing
- Risk and gap analysis
- Cost publications

Scheduling

Litigation Support



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- 85+ dynamic and inclusive team members
- 65+ years of expert costing
- 9 offices, and more coming
- 1 Manager of Canada's Arctic Region

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Michelle Ernst, Business Manager

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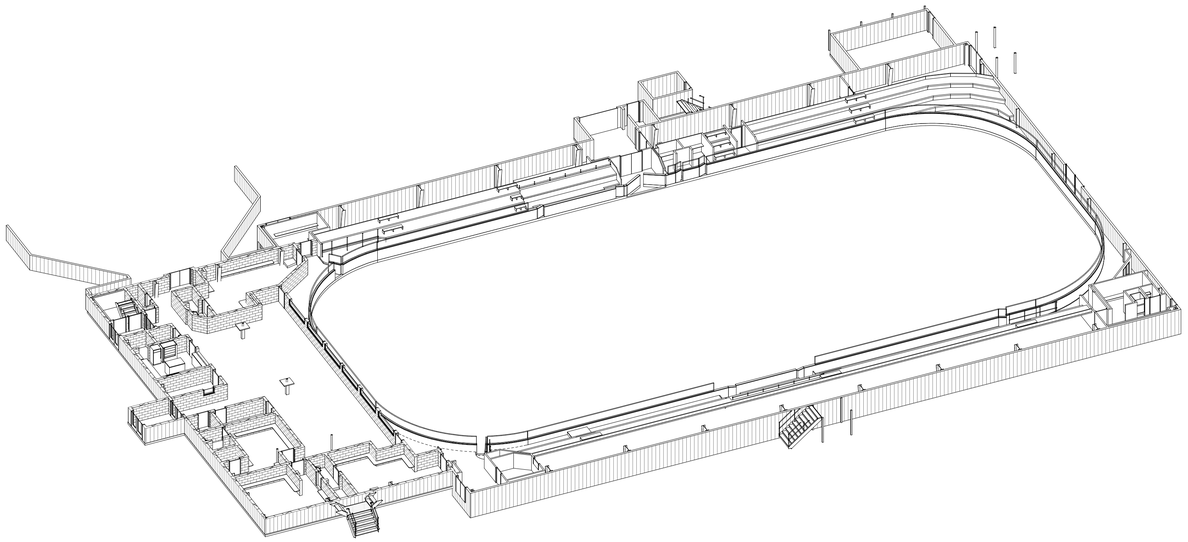
Tyler Keizer, Director of Finance

Appendix B

As-Found Drawings,
J.L. Richards & Associated Ltd.



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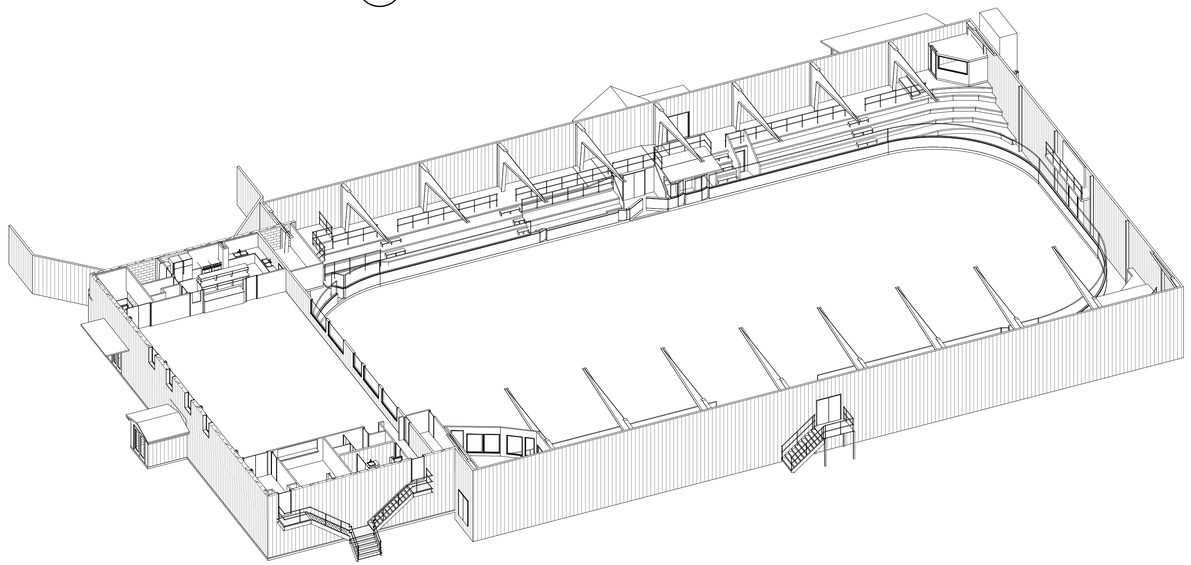

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3D LEVEL 2
SCALE :

AS-FOUND INFORMATION

215 RUE LANG, SHAWVILLE, QC J0X2Y0

WWW.JLRICHARDS.CA

AS FOUND INFORMATION REVIEW | DATE: 07/02/25 | CLIENT No.: XX-XXX | PROJECT No.: 32824

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

DRAWING INDEX:

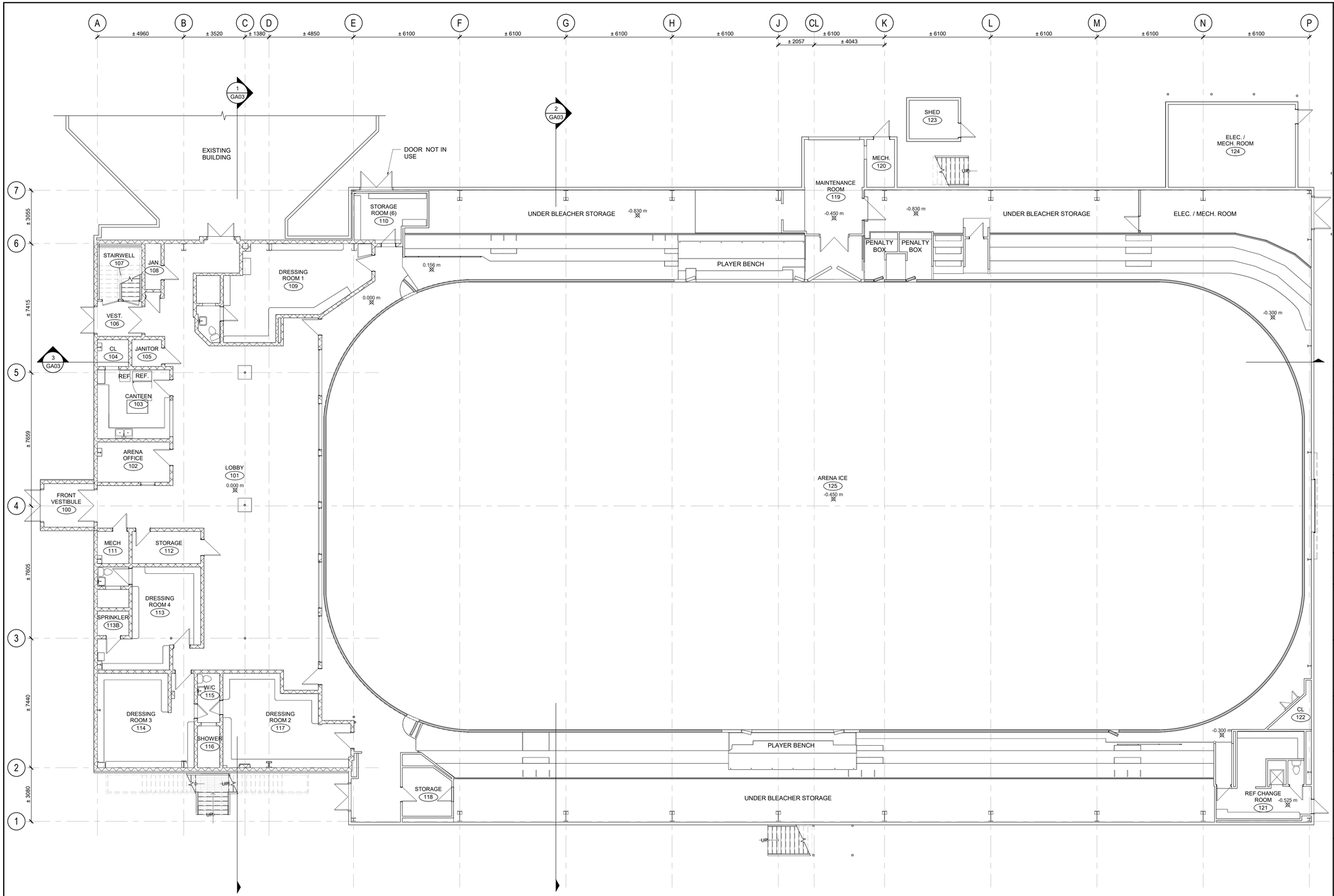
GENERAL DRAWINGS

REVISION INDEX:

No.	ISSUE / REVISION	DD/MM/YY
A	AS FOUND INFORMATION REVIEW	07/02/25

AS FOUND INFORMATION REVIEW | DATE: 07/02/25 | CLIENT No.: XX-XXX | PROJECT No.: 32824

AS-FOUND INFORMATION



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PRELIMINARY DESIGN

THESE DOCUMENTS ARE NOT COMPLETE IN ALL DETAILS AND MAY BE SUBJECT TO CHANGE AS DESIGN DEVELOPMENT AND CODE REVIEW IS ADVANCED.

No.	ISSUE / REVISION	DD/MM/YY
A	AS FOUND INFORMATION REVIEW	07/02/25

VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25mm IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: 1 : 100

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CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

SHAWVILLE ARENA

AS-FOUND INFORMATION

215 RUE LANG, SHAWVILLE, QC J0X2Y0

DRAWING:

LEVEL 1 PLAN

DESIGN: -	
DRAWN: SWW	DRAWING #: GA01
CHECKED: -	
JLR #: 32824	

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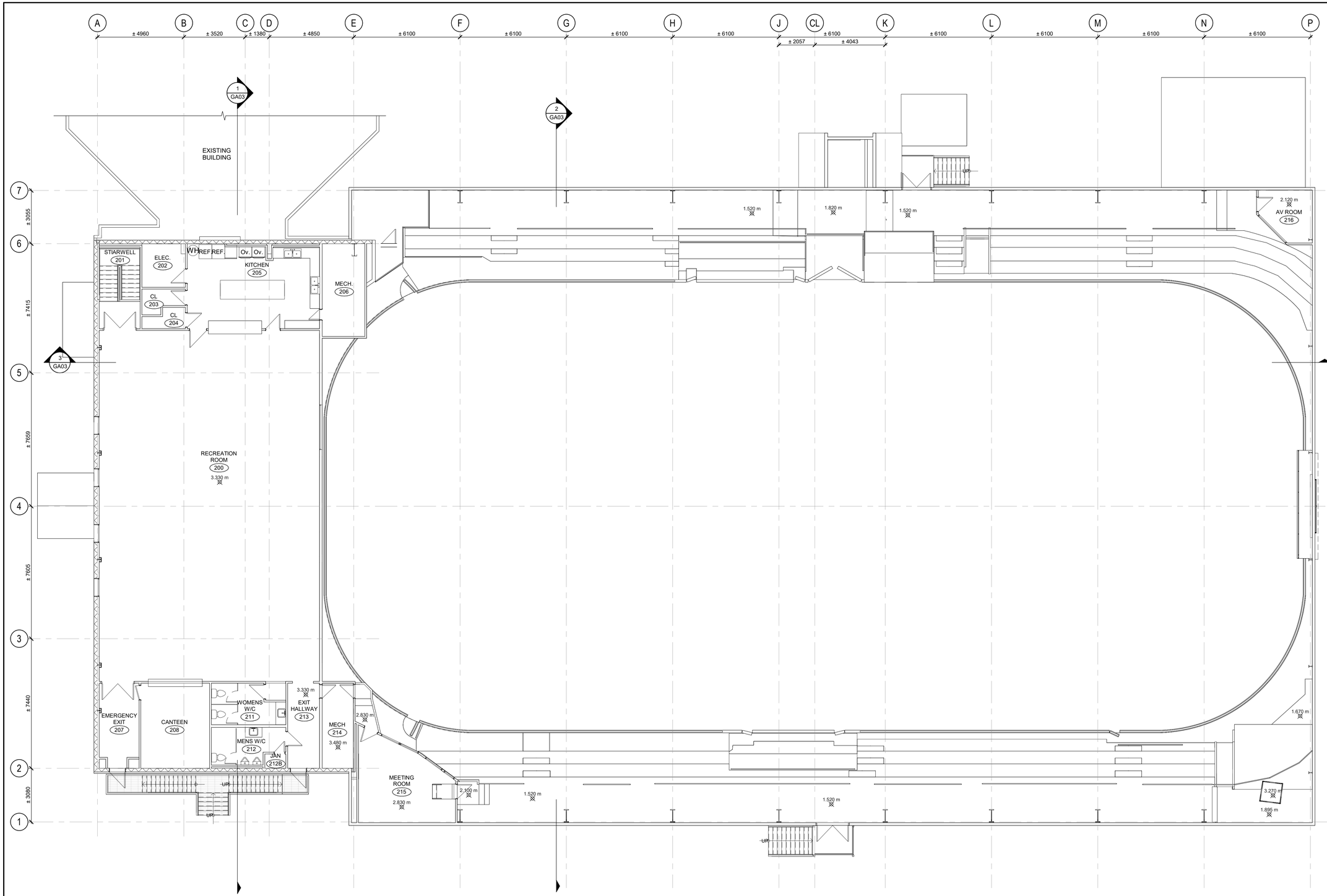

1 GA02

LEVEL 2

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PROJECT:

SHAWVILLE ARENA

AS-FOUND INFORMATION

215 RUE LANG, SHAWVILLE, QC J0X2Y0

DRAWING:

LEVEL 2 PLAN

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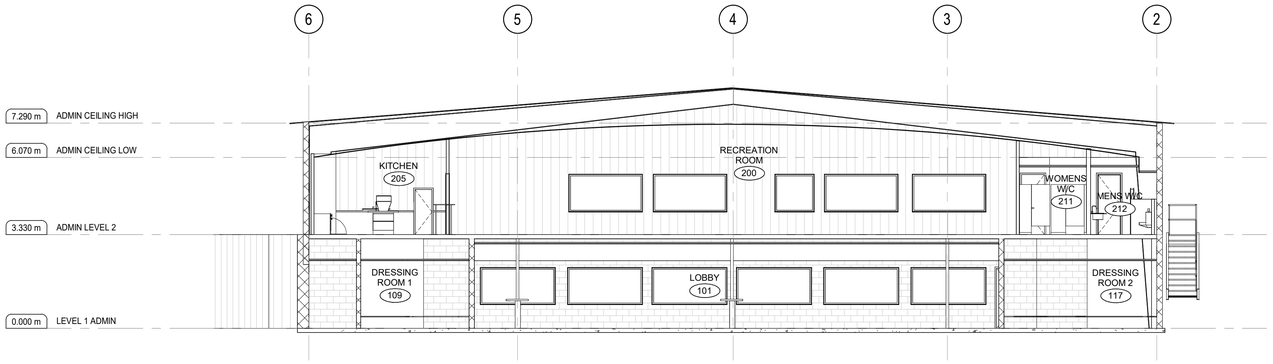

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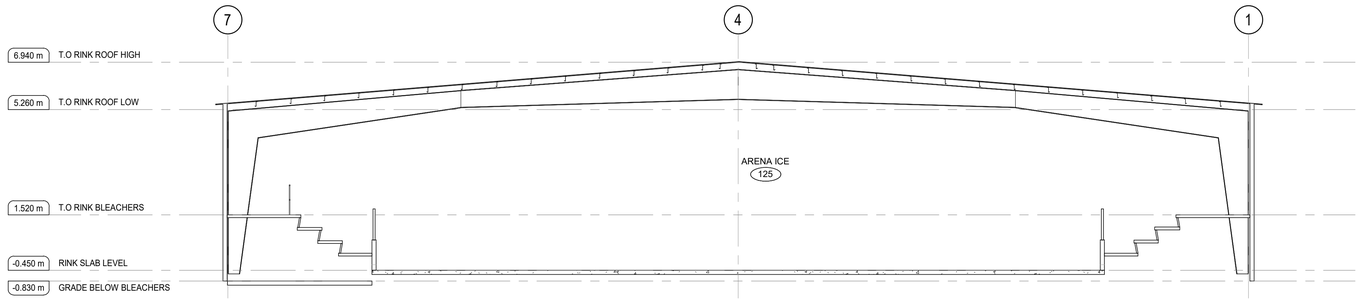

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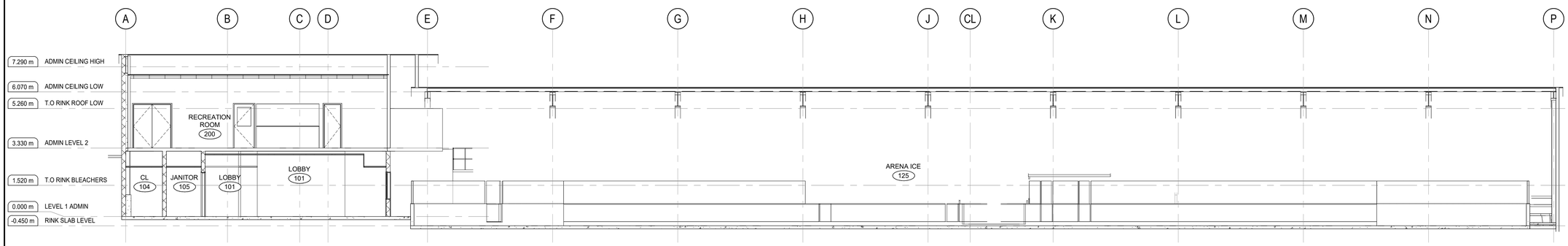

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DRAWING:

SECTIONS

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JLR #: 32824	

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Appendix C

Shawville Arena Limited Building
Condition Assessment and
Summary of Systems,
J.L. Richards & Associated Ltd.

Shawville Arena
Limited Building Condition Assessment
and Summary of Systems

November 2024

Prepared for:

JULIEN GAGNON
350 Main Street
Shawville, QC
J0X 2Y0

Prepared by:

J.L. RICHARDS & ASSOCIATES LIMITED
343 Preston Street, Tower II, Suite 1000, Ottawa, ON K1S 1N4

JLR No.: 32824-000

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Table of Contents

List of Appendices

1.0 Introduction

This report has been prepared for the Town of Shawville to provide a multi-disciplinary review of the existing Shawville Arena structure. Due to the lack of available documents, a member from each major building engineering discipline (Structural, Architectural, Civil, Mechanical and Electrical) went to site to provide a high-level building condition assessment in order to better understand the building systems, surrounding environment, and major equipment within the building. Each discipline conducted a visual review of the Arena and documented key observations of each asset.

As a designated substance report (DSR) could not be provided prior to the site review, the investigation was limited only to items which were visible without moving any ceiling tiles or other obstructions potentially containing designated substances.

The building systems are described in the report by the disciplines including high-level feedback on observed deficiencies, anticipated remaining service life and suitability for possible upgrade or overhaul versus wholesale replacement. The objective of the review is to understand the different building systems, their equipment and their general conditions. The findings of this report will play an important role in assessing the feasibility of the renovation options and would ultimately be included as a separate section in the forthcoming feasibility study. Given the lack of as-constructed information and the accuracy of the information collected in the condition assessment, it is noted that the Town of Shawville will need to carry for additional risk factors which will be better described in the feasibility study.

Figure 1: Key Map

It is understood that a point cloud scan will be performed of the facility with the objective to convert the information into a base plan drawing as part of the next step of this project.

2.0 Methodology

A building condition assessment (BCA) is a total evaluation of the physical state of the structure. It is a multidisciplinary review involving visual inspection, documentation, and detailed analysis. The main goals of performing the BCA are to identify any defects or deterioration, assess the structures overall performance, estimate repair or maintenance needs to extend service life and to ensure safety and compliance with current building codes and standards.

The following report encapsulates the findings of a limited BCA, which differs from a typical BCA. The limited BCA does not include any detailed analysis, inspection or destructive testing. The purpose of the limited BCA is to gain a better understanding of the structure through visual review and any other information available through desktop review and discussion with arena staff. The conclusions made in the following report are high-level and are meant to aid in assessing the feasibility of renovation options with respect to the structure and its components.

The visual review was limited to items which were accessible without altering the building. Therefore, some of the components of the structure were not available for review. None of the ceiling tiles were altered; therefore, none of the components in those areas were reviewed. Additionally, any mechanical or electrical equipment which was inaccessible to the eye were not reviewed. The visual limitations limit the comprehensiveness of the review and should be noted.

Qualitative descriptors will be used within the report to describe the current state of the structures components. The terms used to describe the overall state of the components, ranked from least to highest quality are poor, fair and good. Poor items are critical and require the most immediate attention of the three classifications. Poor items are indicative that the component in question is nearing the end of its service life and should likely be considered for remediation or replacement. Fair items are less critical; however, they still show significant signs of aging and moderate wear. Fair items are indicative of requiring maintenance in the near future to prolong the service life. Good items are not critical and generally indicate the component is in working order. Although the component does not need immediate attention, they should still be regularly reviewed as part of a regular inspection schedule.

The review of local defects and deficiencies shall be described with minor and major descriptors. Minor items are not critical; however, they can be indicative of larger underlying issues and should be carefully considered and monitored. Minor items typically do not warrant immediate remedial works; however, they should be reviewed on a case-by-case basis. Major items may require immediate repairs on a case-to-case basis and should be taken into consideration as part of the remediation or replacement plan for the component in question.

A designated substance report (DSR) is a specialized assessment carried out to identify and document the presence of hazardous materials known as ‘designated substances’ within a structure. The DSR is used to make any persons on site aware of any potential dangers related to designated substances. It is a major control for safety on the worksite, and an essential practice before performing any altering actions to a structure. As a DSR was not provided for the Shawville Arena, the BCA was limited to a solely visual review without moving any

obstructions. The reasoning for this is purely for the safety of the JLR personnel on site and the dangers surrounding the unknown presence of designated substances.

3.0 Architectural Systems

A visual review of the interior and exterior of the Shawville Arena was performed by Justin Gauthier, Senior Technologist (Architecture) on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the building operator, which generally forms the understanding of the overall architectural systems. No record drawings of the existing building were made available to JLR.

3.1 Building Envelope

The building envelope is primarily pre-finished metal cladding with no insulation under the bleachers but was noted to be fully insulated for the remainder of the exterior walls, punched windows, and hollow metal doors throughout. The existing cladding is assumed to be original to the building's construction and appears to be in poor condition with areas of visible weathering and damaged sections at the bottom perimeter where daylight is observed from within. The building operator noted that in the spring there’s significant flooding/water infiltration along the west elevation due to improper grading and large holes within the cladding. The building operator indicated that the punched windows are recycled windows from the existing hospital. The hollow metal doors within the rink area were recently replaced, but the remainder of the doors are assumed original. Full replacement of the exterior wall assembly and windows should be considered to provide a sealed and properly insulated envelope.

3.2 Roof

The roof appears to consist of sloped, pre-finished metal cladding with an unknown assembly below, as the review was visual in nature only. It was noted by the operator that the roof is fully insulated, but the potential R-value is unknown. The roof appeared to be in fair condition with no indication of roof leaks.

3.3 Interior

The South portion of building consists of two levels with no basement. The south portion of the building is mainly occupied by the dressing rooms, main lobby, and auxiliary spaces (storage, canteen, water entry closet, etc.). The second floor consists of a community space, which is mainly open, with washrooms, a kitchen, and servery. The rink is located to the north of the lobby with bleachers on the east and west sides. The refrigeration plant is located at the northwest corner. The space under the west bleachers is used as storage with mix division and the remainder of the original refrigeration equipment. The ice resurfacing area is located near mid-rink on the west side with limited ceiling height that the Zamboni operator cannot be seated in an upright position without hitting the ceiling The east bleachers space is used for storage. A referee changeroom and washroom facility is located on the northeast corner of the footprint with direct exit to the exterior. It was indicated by the operator that the rink size does not currently meet Hockey Canada regulations and has been modified slightly during the last refurbishment of the ice plant. It was noted that the refrigerant slab extended beyond the ice surface which causes ice build up within the walking surface to access the bleachers.

The ground floor construction consists of a slab-on-grade. The second-floor assembly is unknown but appears to be wood-joist construction complete with subfloor and gypsum board finish on the underside. The rink seating/bleachers appear to be a steel structure with solid wood boards as flooring and risers. The building's interior walls throughout consist of painted plywood and painted concrete block within the lobby, dressing room area, and second level banquet hall. The rink area consists of painted plywood, painted block walls, pre-finished metal cladding, and exposed structure. The ceilings primarily consist of painted and/or PVC finished gypsum board ceiling tiles within the second-floor banquet hall and painted exposed structure within the rink area. The flooring throughout the building varies among carpet, ceramic tiles, vinyl sheet flooring, rubber flooring, and polished concrete. Overall, the interior paint finishes would require repainting, and the floor finishes would require full replacement. The washroom facilities on the ground floor are shared facilities within the roundhouse addition and not part of the lobby area of the rink. The second-floor washroom facilities appeared to be in fair condition. There are two kitchens, one located on the ground and the other one on the second level, full replacement of the interior fitments should be considered as part of any proposed renovation project. The washrooms within the dressing rooms and referee room are in very poor condition and full replacement should be considered as part of any proposed renovation project.

3.4 Accessibility

Due to the age of the building, accessibility within the facility doesn't meet current Quebec Construction Code (QCC 2015). Upgrading the facilities to meet current building code standards will require extensive renovations and could make it difficult and costly to accomplish. At a high level this consists of the following major items:

- Barrier-free washrooms.
- Elevator or lift for barrier-free access to all levels.
- Ramps and doors.
- Larger corridors.
- Barrier-free changerooms.

3.5 Building Code

Full building code review wasn't completed as part of this scope; therefore, it is unknown if current fire separation, egress, and washroom facilities are adequate to meet current code requirements.
Applicable codes for this facility would include:

- Quebec Construction Code, Chapter I – Building, and National Building Code of Canada 2015 (amended)
- Quebec Construction Code, Chapter I.1 – Energy Efficiency of Buildings
- Quebec Construction Code, Chapter II – Gas
- Quebec Construction Code, Chapter III – Plumbing
- Quebec Construction Code, Chapter IV – Elevators and Other Elevating Devices
- Quebec Construction Code, Chapter V – Electricity

4.0 Structural Systems

A visual review of the interior and exterior of the Shawville Arena was performed on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the building operator, which generally forms the understanding of the overall structural systems. No record drawings of the existing building were made available to JLR. The structure can be divided into two regions: The rink and the lobby/community space.

4.1 Rink Structure

The Shawville Arena is a steel-framed structure constructed using a typical pre-engineered building system. The rink footprint is wider than the lobby by approximately 3 m per side. Operators and other Shawville Staff indicated that the structure was provided by Butler Manufacturing and was constructed some 60 years ago.

The structural system is sub-divided into primary and secondary framing as described below.

4.1.1 Primary Framing

The main gravity system of the Shawville Arena consists of rigid steel frames made of tapered wide flange steel sections typical of pre-engineered structures of its era. The moment frame consists of tapered welded wide flange section columns with varying depth welded wide flange steel roof beams which span the width of the structure. Members have bolted connections at splice areas and bottom flange bracing to provide lateral stability. The steel frames appeared to be spaced at regular intervals along the length of the Arena.

Overall, the condition of the primary structure elements was generally good. Minor chips and scrapes on the surface coating of the steel members was observed in localized areas; however, the steel columns and roof beams appeared to be well maintained throughout. The bolted connections between beam and column elements appeared to be in fair-to-good condition with minimal, minor deficiencies observed. Minor deficiencies include scratch marks on the steel surface and light rust staining.

The majority of the steel column bases were not accessible and therefore not reviewed. The east side columns could not be reviewed given interferences with existing bleachers; however, approximately half of the west side columns baseplates could be reviewed from within the storage under the bleachers and displayed signs of moderate rusting. Signs of water infiltration on the western side of the structure under the bleachers was observed is likely the cause of the ongoing rusting. The space under the bleacher is also not conditioned and can likely be considered as exterior. The top of the visible concrete piers under the plate anchors was observed to be deteriorated with moderate cracking and spalling.

The lateral force resisting system consists of braced roof bays, rod bracing and moment frames. The braced roof sections provide lateral stability in the horizontal plane at the top of the structure. Lateral movement from seismic and wind forces is limited by transferring it to the vertical members of the structure. The braced roof sections available for review were observed

to be in fair-to-good condition. Minor deficiencies include scratch marks on the steel surface and light rust staining.

Cross bracing on the vertical wall sections were observed consist of rod bracing. The rod bracing in these locations aid in resisting lateral forces in the vertical plane. The diagonal rod braces connect the corners of a bay which inherently increases the stiffness of that section, allowing it to better resist shear forces. Lateral forces are then transferred more easily through the vertical members to the foundations. These vertical cross braces are typically placed in strategic locations where the most lateral loading is anticipated, which make them a critical component of the lateral force resisting system. Majority of the vertical rod bracing available for review was observed to be in fair-to-good condition. Minor defects such as scratch marks on the steel surface and light rust staining were observed in localized areas. Some of the rod braces were observed to be cast into concrete block walls. The remaining rod braces and end connections were unavailable for review in those areas.

The main component of the lateral force resisting system are the moment frames. Moment frames consist of rigid connections between the columns and beams of the system which resist rotation and bending. When experiencing lateral forces, the moment frame absorbs them through internal moments created at the rigid member connections. Moment frames are used in structures requiring large open areas, such as a hockey rink, and are often combined with braced frames as observed in the Shawville Arena structure. Overall, the steel moment frames and rigid connections were observed to be in fair-to-good condition.

4.1.2 Secondary Framing

The secondary framing consists of the steel purlins, steel girts and lateral cross bracing members. The steel purlins were observed to rest on the main structural moment frames and span the entire length of the rink structure. They appeared to consist of Z shape steel profiles regularly spaced. The prefabricated steel panel roof system is attached to the top of the steel purlins with a series of bolts spanning longitudinally. The steel purlins were observed to be in fair condition with defects observed including minor deformations, scratch marks and minor rust staining.

The steel girts are likely installed between the exterior metal cladding and the interior liner panel and span between steel columns. Majority of the steel girts could not be observed, however based on the era of construction and traditional pre-engineered structures and fastening of the liner panels, it is expected that these would consist of Z or C shape steel profiles at regular spacing. At one location underneath the bleachers, a steel girt was visible for review and was observed to be a Z profile. It cannot be confirmed if this is the case throughout the structure but is likely anticipated. The observed orientation of fasteners on the exterior of the structure appeared to be regularly spaced and indicate the likely location of the steel girts.

4.1.3 Foundation and Slabs

As this was a non-intrusive investigation, none of the foundation elements could not be reviewed below grade. A small portion of exposed concrete foundation wall could be observed in some areas around the perimeter. However, JLR is unable to comment on the state of the foundation elements at this time.

The concrete base slab, where available for review, displayed significant signs of deterioration. Observed cracks ranged from moderate to wide at the base slab locations available for review. Instances of moderate and severe spalling and scaling of the concrete were observed in various locations including at the location of the Zamboni entrance as shown in Photo 9 of Appendix A and along the perimeter of the rink. The same was observed at other areas where the base slab was exposed including underneath the bleachers and in storage areas on the perimeter of the Arena. As the rink still had ice at the time of the original review the base slab at that location was unavailable for review. Additionally, when the team revisited the site, dirt was placed over the rink area in anticipation of an upcoming exposition. A dozer was positioned outside the access doors. Building operators have indicated that the refrigerant slab is in poor condition and have often gone through local repairs as a result of leaks. It is unlikely that the slab was designed for heavy equipment loads. This should be considered as part of future projects when replacing the refrigerant slab.

When returning to site a third time to perform 3D scanning of the arena, the slab was exposed and available for review. Multiple areas of minor-to-moderate localized scaling and spalling were observed throughout the slab. A large crack running in the east-west direction was observed at the south end of the rink slab. The areas where the hockey nets are installed displayed moderate scaling. Overall, the rink slab was observed to be in fair-to-poor condition.

Additionally, water infiltration was observed in various areas along the outer edge of the Arena, particularly on the western face where the exterior cladding has deteriorated. The pooling of water on the concrete slab surface induces corrosion of the reinforcing steel and leads to long term structural issues. Given limited insulation within the exterior walls, the rink slabs have been mostly exposed to exterior conditions through its services life.

4.1.4 Bleachers

The bleachers are constructed using wood framing and are supported on steel wide flange spanning longitudinally under the top step of the bleachers. Smaller steel wide flanges are placed perpendicular to the longitudinal beam parallel to the slope of the steps. The bleacher is tied back and supported on an additional beam that spans between main rink columns. Round Hollow structural steel (HSS) posts were observed to be used as columns and were bolted to the large longitudinal steel beam. The HSS posts appeared to be founded on concrete blocks which rested on top of the base slab.

The steel beams were observed to be in fair-to-poor condition, with moderate rusting observed throughout. Section loss was not visibly apparent, so it is assumed the rust observed is limited to the surface; however, the steel members should be regularly monitored to track the progression of rust. The concrete bases were observed to have some cracking and spalling. The steel supports were observed to be in fair condition with some minor scratch marks and light rusting.

4.2 Lobby and Community Space

The width of the lobby and community space structure is smaller than the rink by approximately 3 m on each side. The entrance structure is also taller than the Arena based on the distinction in roof levels. This area of the building has two floors. The first floor contains the lobby and a handful of spaces including offices, dressing rooms, canteen, mechanical rooms, etc. The second floor serves as a banquet hall and also has with restrooms, kitchen and bar/servery as

well as auxiliary spaces for Electrical and mechanical rooms. Although described as two sections, it assumed that the areas were constructed simultaneously with the rink and was provided by the same manufacturer.

4.2.1 Primary Structure

The primary structure appeared to consist of a rigid steel frame similar to the rink structure. Some of the steel columns were visible from the dressing rooms which shared a similar construction to the rink area. Interior steel columns were observed from the first floor from within various changerooms. The roof members were visible for review given a suspended ceiling construction and tiles could not be removed without a designated substance survey. It is anticipated however that the transverse system consists of similar roof beams to the members observed in the adjacent rink structure.

Although not visible throughout given the presence of drywall ceilings, a few areas within closet spaces and auxiliary spaces the structure of the second floor appear to consist of nominal wood joists with tongue and groove decking. A series of HSS columns is visible within the main lobby area indicated the likelihood of a supporting structure. It is unclear if some of the masonry partitions also act as load bearing elements for the second floor.

From what was available to be reviewed, the lateral force resisting system of the lobby and community space structure consists of vertical rod bracing and moment frames. Braced roof sections may be present but cannot be confirmed due to the limitations of the review. The vertical rod braces available for review were observed to be in fair-to-good condition. Minor defects such as paint chipping and light rust staining was observed in localized areas. Some of the rod braces were observed to be cast into concrete block walls. The remaining rod braces and end connections were unavailable for review in those areas. In one location in the yellow dressing room to the east of the lobby, a rod brace end connection was observed at the base of a steel column; however, no rod braces were present. It is possible that the rod braces were removed in this location.

The main component of the lateral force resisting system, the moment frames, were not available for review. The rigid connections between the column and beam members were obstructed and unable to be reviewed.

4.2.2 Secondary Structure

Given the similarities in construction type, it is assumed the secondary structure consists of steel purlins and steel girts; however, they were not able to be reviewed as they were not exposed.

4.2.3 Interior Rooms

The interior rooms were observed to have been primarily constructed with concrete block walls. It is unclear whether the walls are load bearing from the visual review. The concrete block walls were observed to be in fair condition with minor cracks and spalls observed. In the yellow-walled dressing room located to the east of the lobby, a major spall was observed adjacent to the interior column. Said spall should be repaired to prevent propagation of further deterioration.

Partitions appear to be constructed of masonry, it is unknown if the masonry is load bearing in some areas or if they have been reinforced. Given the era of construction it is anticipated that the unreinforced masonry would have been used at the time.

4.3 Exterior Structures

Two additions are located on the western face of the structure: a mechanical room on the northwest corner and a Zamboni storage room. Both additions were observed to have the same cladding as the rest of the structure. A section of cantilevered roof at the mechanical room structure is supported by wood columns founded on concrete piers. The wood columns appeared to be in fair condition. The concrete pier caps were observed to be in fair condition. The subsurface concrete piers were not accessible and therefore not reviewed.

5.0 Civil Assessment

A visual review of the interior, exterior and on-site services of the Shawville Arena was performed on August 16, 2024. The investigation was limited only to what was visually accessible. A limited description of the on-site services was provided by Brad Peck, which generally forms the understanding of the servicing. Mr. Peck was able to expose several storm and sanitary maintenance holes, which were visually reviewed from the surface. A description of the on-site services is provided below. No record drawings of the on-site services were made available to JLR.

5.1 Overview of the Site

The Shawville Arena is located at 215 Lang Street in Shawville, Quebec, a town of approximately 1,700 residents located in the Pontiac Regional County Municipality in the administrative region of Outaouais. The site is bounded by Lake Street to the west, Lang Street to the south, Clarendon Street to the east and PPJ Cycloparc bike path to the north. The site houses multiple buildings referred to as (from west to east): 4H building, Festival/Storage building, Octagon building (offices), the Shawville Arena, and multiple barns (see location map below). The Arena is accessed via the extension of Campbell Street north of Lang Street. The site of approximately 5.5 ha is mostly grassed with the exception of a gravel parking area of approximately 0.45 ha located at the front of the Arena. There is a +/-7.5 m wide asphalt strip directly in front of the buildings that extend from building 4H to the east side of the Arena. There is also a gravel access road abound the Arena and two additional gravel roads to Clarendon Street and the rear of the property.

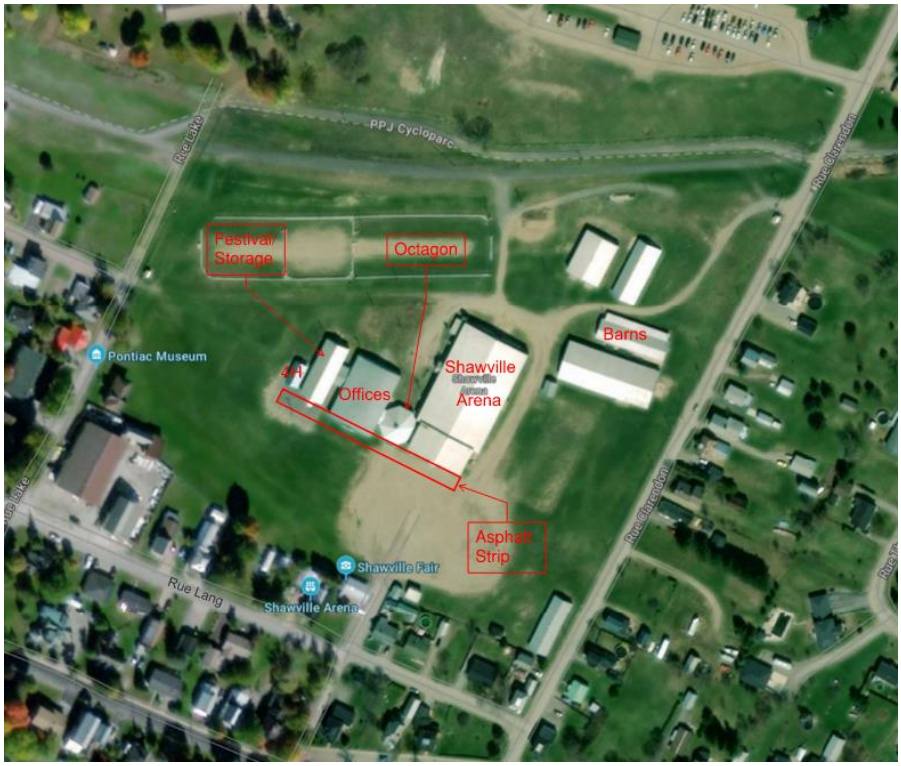

Figure 2: Shawville Arena Site Overview

5.2 Water

Based on discussions with the building operator and city Staff, it is understood that the Site is serviced from Lang Street (150 mm) and Clarendon Street (150 mm). The main adjoined buildings are serviced by a single 38 mm connection to the 150 mm service from Lang Street, located near the main entrance of the Arena. The front part of the Arena is serviced by a 38 mm service, branching off the 38 mm service connected to the main 150 mm line. Two internal areas in the rear of the Arena and the adjacent “Octagon” building (mainly offices) are serviced by an existing 50 mm galvanized steel water service, which connects to the 38 mm service for the front portion of the Arena. This service first crosses beneath the Octagon building, then under the Arena itself. A third branch (38 mm) services the adjacent “festival/storage” building. A hydrant is installed near the main entrance of the building, connected to the 150 mm service off the Lang Street watermain.

At the rear of the property, a second 150 mm water service from Rue Clarendon is provided for approximately 200-250 m with three additional hydrants connected along the run. It is understood this watermain is dead ended adjacent to the “4H” building. This 150 mm water line also supplies the “4H” building with potable water.

5.3 Sanitary

It is understood that sanitary servicing for the Arena is from Lang Street via a 150 mm asbestos concrete sewer within the municipal road allowance, and a 150 mm bituminous-fibre pipe (i.e., NoCorrode or similar) within the fair grounds. The sanitary service for the Arena connects to a maintenance hole at the upstream end of the municipal sewer line in Lang Street, located approximately 25 m west of the Campbell Street. Closer to the building, operators indicated that recent excavation works revealed that part of the sewer line had been replaced with PVC pipe. City staff indicated that past CCTV inspections performed on this line have not identified any significant defects.

There are two existing sanitary maintenance holes located near the Arena entrance that receive sewer flow from several branching 125 mm sanitary sewers servicing the adjacent buildings and Arena dressing rooms. It is understood that only portions of the Arena building are serviced in this way. It was indicated that in some areas at the north end of the building, floor drains are routed to the storm sewers and not to the sanitary sewer system.

A separate holding and percolation tank septic system is located to the north of the Arena. This system only services the referee room bathrooms in the northwest end of the Arena.

5.4 Storm

A visual review of the site suggests that the majority of storm runoff coming from lands to the north and Clarendon Street to the east converge to an existing catch basin located in a major low point within the field east of the Arena. Storm servicing for the site is mostly captured and conveyed via two perforated pipe systems along the back and east side of the Arena. The first one consists of 100 mm perforated pipe (“Big-O” type black corrugated HDPE or similar) that provides drainage to an adjacent barn and to the area behind the Arena. The second consist of 150 mm perforated pipe (white PVC - slotted) that runs behind the Arena and connects directly into an existing 600 mm sewer that outlets to the Clarendon Street storm sewer. It was noted that internal floor drains for low areas within the Arena building and Zamboni room are connected to the perforated pipe system.

There is another storm sewer system east of the Arena that captures storm runoff at a low point in Clarendon Street via two roadside catch basins connected to a storm maintenance hole located on the Arena property. From that point, flows are redirected southerly via a 300 mm storm sewer to a second on-site maintenance hole before discharging to a maintenance hole in Clarendon Street via a 600 mm diameter storm sewer. This 600 mm diameter storm sewer receives storm runoff from the perforated pipe systems described above.

Site staff noted that a drainage issue exists in the rear of the Arena, in close proximity to the Chiller manifold vault. Visually, there appears to be a low-lying area at the rear of the Arena, bounded by the Arena itself, the Octagon building, and the Storage/festival. Water infiltration on the west portion of the building suggest negative grades around the building. City staff also indicated that areas under the bleachers often fill with water in the spring and during major storm events.

5.5 Third-Party Utilities

Site electrical servicing was observed to be from an assumed easement located to the north of the property. It was noted that some adjacent areas are serviced separately. For example, exterior pole mounted lighting at the south parking lot appears to be serviced through the private properties along Lang Street, and some barns/site lighting from fly-taps located on Clarendon Street. Several Hydro poles complete with transformers are located in the building area located to the rear and west side of the Arena building. Potential locations for buried services were noted in the main parking area at pole mounted outlets.

Propane tanks were noted throughout the site. Site staff noted there is no natural gas service to the Arena.

An existing Bell service line was noted from Lang Street, running along the existing sanitary service. This was confirmed by the town during excavation work where the buried bell was encountered. Other overhead services were observed at the main entrance. It is not known if those also directly service the main buildings.

6.0 Mechanical Assessment

A visual review of the interior and exterior of the Shawville Arena was performed on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the building operator, which generally forms the understanding of the overall mechanical systems. No record drawings of the existing building were made available to JLR.

6.1 List of Equipment

- One oil furnace
- One propane furnace
- Six hot water tanks
- One ammonia cooling system
    - One evaporator and accumulator (chiller).
    - Two compressors (and their motors).
    - Two oil separators.
    - One water tank.
    - One brine tank.
    - One brine circulation pump (and motor).
    - One cooling tower.
    - One ammonia room exhaust fan (and ammonia detection system).
- Two indoor air conditioning units.
- Several washroom exhaust fans.
- Two kitchen exhaust hoods (with fire suppression systems).
- Two dehumidifiers (one serves only as a fan)
- Various sinks and water closets.
- Four radiant tube heaters.
- One propane DHW heater (in Zamboni room)

- Two electric heaters (one in referee room, one in ammonia room).
- Baseboard electric heaters (in VIP viewing box.
- Several fire extinguishers
- Sprinkler system.
- Nine outdoor fuel storage tanks.
    - One large propane tank.
    - One set of four smaller propane tanks.
    - One set of three smaller propane tanks.
    - One oil tank.

6.2 Mechanical Systems

6.2.1 Furnace Systems

There is one Jackson & Church oil-fired furnace located on the second floor serving the lobby and dressing room 1. The age of the furnace could not be determined at the time of the visit. The expected useful life for this type of equipment is 18 years. Judging by the amount of dust and it is expected that it was installed more than 18 years ago, and therefore should be considered for replacement.

There is one Rheem propane-fired furnace located on the second floor serving the upstairs, the sprinkler room, and dressing rooms 2, 3, and 4. It has a capacity of 112,000 Btu/hr and is expected that it was installed in 2016. The life expectancy of furnaces is approximately 18 years and therefore should be considered for replacement in 2034.

Ventilation rates could not be verified and no evidence of outdoor air (OA) or exhaust air (EA) ducting or louvres were found during the visit. Ventilation should be further analysed for code compliance. Based on available information, it is assumed the ventilation system is not code compliant.

6.2.2 Domestic Hot Water (DHW) Systems

There are two propane DHW heaters located in the mechanical room near the front entrance of the building which services the washrooms and changerooms. The first heater is a 65-gallon AO Smith heater installed in March of 2011. The heater has a capacity of 251,000 Btu/hr. The useful life expectancy of DHW tanks is approximately 15 years and therefore should be considered for replacement in 2026. The second is a 62-gallon John Wood DHW heater and is currently being used in series to the AO Smith heater as a storage tank, with its heater function disabled. It had a capacity of 270,000 Btu/hr installed in 1987. It has passed its useful life and therefore should be replaced.

There is one propane 65 US GAL Rheem DHW heater located in the Zamboni room on the ground floor which serves the Zamboni. It has a capacity of 360,000 Btu/hr and was manufactured in 2011. DHW heaters have a useful life of 15 years and therefore this heater should be considered for replacement in 2026.

There is one 240V electric 45 US GAL Giant DHW heater located under the stairs located on the first floor. It has an input capacity of 10,236 BTU/hr 3kW). The areas being served by this

DWH heater could not be determined at the time of the visit. The heater was installed in 2002 and therefore has surpassed its useful life and should be replaced.

There is one 240V electric 48.6-gallon Giant DHW heater located in the kitchen on the second floor that services the kitchen. It has an input capacity of 10,236 BHU/hr (3kW). It was installed in July of 2021 and has an expected life cycle of 15 years. The tank should be considered for replacement in 2036.

Operators indicated that there is also one electric DHW heater located in the referee's changeroom. JLR was not able to find the unit therefore the unit's age, capacity, and condition were not observed and cannot be commented on.

6.2.3 Chiller Systems

An ice rink ammonia refrigeration system is located in a dedicated mechanical room (ammonia room). The system comprises the evaporator and accumulator barrels, two belt-driven reciprocating compressors, oil separators, brine tank and pump, open cooling tower tank and a dedicated pump, interconnecting pipework including valving and instrumentation. The cooling tower is located externally, just outside of the mechanical room. The equipment appears to be of varied condition with no clear and consistent age and installation date.

Evaporator and Accumulator:
The evaporator and accumulator barrels were manufactured (and most likely installed) by CIMCO in 2018. The internal condition of the heat exchanger is not known. The units were dirty at the time of review. Dirt traps moisture and promotes deterioration of surfaces and speeds up equipment aging. If kept in good conditions the shell-and-tube heat exchangers can operate for decades. It is recommended internal condition assessment is performed in 2038, and replacement scheduled based on condition.

Compressors:
Two reciprocating, belt-driven compressors are serving the rink chiller installation and are installed in the mechanical room.

One compressor was installed in 2015 and based on visual assessment it appears to be in fair to poor condition. The unit, the belt guard as well as the motor are dirty, with the compressor body showing evidence of leaks, and corrosion in various places. The expected useful life of compressors within a refrigeration system is approximately 25 years, but largely dependent on quality of maintenance performed. It is suggested that this compressor be considered for replacement in 2040.

The other one compressor's manufacturing and installation dates are unclear. The compressor is in poor condition, with significant corrosion on unit's body as well as belt guard, electric motor and base frame. Evidence of leaks were also noted. It is assumed that it has reached the end of its service life and should be replaced.

Motors:
There is one 600V, 60HP AO Smith AC motor serving the newest of the compressors (installed 2015); however, its age could not be confirmed at the time of the visit. If kept in good condition, the approximate useful life for AC motors is approximately 18 years, but his motor appears to be

in fair to poor condition, with significant dirt buildup and some corrosion visible. Therefore, it should be considered for replacement in the next two to three years.

There is one 600V, 40HP Lincoln Motors motor serving the older of the two compressors. The motor is in poor condition, with significant corrosion on motor's body as well as belt guard and base frame. It is assumed that it has reached the end of its service life and should be replaced.

Oil Separators:
There are two oil separators connected to the compressors within the system. The first separator is from Henry Technologies and its age could not be determined at the time of the site visit. The useful life for this type of equipment is approximately 20 years. There was no identification tag found for the second separator. It appeared to be in good condition, but its age could not be determined at the time of the visit. The expected useful life for this type of equipment is 20 years.

Tanks:
There is one water tank that supplies the compressors with cooling water as well as the cooling tower. Its age could not be determined at the time of the visit. The tank appears to be in fair condition but dirty, and corrosion was observed on associated piping connections and fittings.

There is one brine tank containing the brine which circulates beneath the surface of the ice. Its age could not be determined at the time of the visit. Tank is in fair condition, but evidence of leaks (corrosion of equipment standing below the tank) and brine residue were noted.

Cooling Towers:
There is one B.A.C. cooling tower located outside of the chiller room. The cooling tower was installed in 2013 and appears to be in good condition. No evidence of leaks or extensive deterioration have been observed. The expected useful life for steel cooling towers is approximately 20 years. Cooling tower replacement to be considered in 2033, based on its condition at the time.

Brine Circulation Pump:
There is one Armstrong brine circulation pump located in the ammonia room. The expected useful life for circulation pumps is approximately 15 years. The installation date could not be determined at the time of the visit, but it is very rusted and deeply corroded and should be considered for replacement

Brine Circulation Pipes:
The brine circulation pipes serve below the ice rink. The connections and valves at the brine circulation pump are in similar rusted and corroded condition to the pump itself. The cooling header is very dirty, and its condition is difficult to assess. The refrigerant lines branching from the header could only be observed at their connection points, which are held in place my rusted hose clamps in poor condition. The installation date could not be determined at the time of visit. If kept in good condition, the useful life of circulation pipes is approximately 35 years. It was noted by the operator that a number for pipe under the slab have failed in the past and required repairs.

Refrigerant Piping:

The refrigerant piping age could not be determined at the time of the site visit however it appears to be in fair condition overall, with most pipes painted or insulated to protect them from further corrosion, but their current condition under the paint and insulation is difficult to assess. Flanges and connections show more corrosion and are in poorer condition than most of the piping. One section of ammonia supply piping is in very poor condition, with visible rust and excessive peeling paint. If kept in good condition, the expected life cycle for refrigerant piping is 40 years.

6.2.4 AC Units

There are two ThermoPlus II AC units located in upstairs in community room. The age of the units could not be determined at the time of the visit. AC units have an expected life cycle of approximately 15 years. It is assumed that the AC units were installed more than 15 years ago and should be replaced.

6.2.5 Exhaust Fan Systems

The washrooms were served by exhaust fans. They are installed in the ceiling space and the physical condition could not be observed at the time of the visit.

The ammonia room is equipped with one wall vented exhaust fan interconnected with the ammonia detection system. A remote display in the Zamboni mechanical room also alerts the operator if high concentrations of ammonia are detected. The age of the fan could not be determined, but it appears to be in fair condition.

There is one Zehnder Rittling exhaust fan located in the Zamboni room. The age of the unit could not be determined at the time of visit, though it appears to be in good condition with no corrosion or dirt visible.

There are two Canarm fans located on the second floor. One is located in each of the furnace rooms, as controlled by a wall-mounted thermostat. The fans were installed in 1999 and based on their age have passed their service life and should be replaced.

There is one exhaust hood servicing the stove in the upstairs kitchen. The building operator indicated that there are immediate plans to remove this equipment. The hood is equipped with a fire suppression system “Pryo Chem” complete with a remote release panel. There were no inspection/certification tags visible at the time of visit. A paper filter was observed inserted in the exhaust port of the hood – a fire hazard.

There is one exhaust hood servicing the stove in the ground floor “canteen” kitchen. This fan is interlocked to disconnect the gas supply to the stove. Its condition has not been reviewed due to limited access. This exhaust hood appears to be equipped with a fire suppression system (visible discharge nozzles), but no gas cylinder/release mechanism or control panel was found. The metal baffle filters on the hood were very dirty and appear to be corroded. Those should be cleaned regularly and replaced as required. A pressure cleaning tag was observed on the hood with date: April 2022. Observed. A flexible, non-fire rated duct appears to be connecting the hood with the exhaust system.

The commercial kitchen hood systems require certification and periodic inspections. No inspection or certification tags were found during the site review on either of the hoods. This item, as related to life safety and building insurance coverage should be further verified.

6.2.6 Dehumidification Systems

There are two dehumidifiers located in the rink area of the building. The first dehumidifier is a silica gel-type Concepts and Designs Inc. unit and has a 3HP supply fan with a 2000cfm capacity, a 1.5HP reactivation fan with a 553cfm, propane burner 120,000 Btu/hr. It was installed in 2007 and has a useful life of approximately 20 years. It should be considered for replacement in 2027.

The building operator indicated that the second dehumidifier is currently being used as a fan in the rink area. From the factory, this unit was a 600V CIMCO unit equipped with a 7.5HP compressor motor, a 1HP fan motor, 1,433.10 BTU/hr (420W) drain heater, and 13 lbs of R-22 refrigerant. It should be noted that R-22 has been phased out and is no longer serviceable, therefore it is recommended that this unit be replaced.

6.2.7 Plumbing

Domestic water is supplied from the municipal supply. The first main water service entry point was found at the front of the building, and a secondary entry point is at the side serving the Zamboni mechanical room. Neither entry point is metered or protected by a backflow preventor.

There are two washrooms on the second level of the building. The women's washroom contained two water closets and one lavatory. The men's washroom contained two water closets, two urinals, and one lavatory. The plumbing fixtures appeared to be in good condition. It is suggested that the fixtures be replaced as required. There are two double sinks located in the upstairs kitchen. They appeared to be in good condition.

There is one double sink located in the canteen room. It appears to be in good condition. It is suggested that the plumbing fixtures be replaced as required. There is a bar area on the second level of the building. As it was locked, this area was not available for review.

There is one water closet and one shower located in the referee room on the ground floor. The shower and water closet appeared to be in poor condition at the time of visit and it is suggested that they be replaced. There is one mop sink located in the Zamboni room on the ground floor. The sink appeared to be in good condition at the time of visit. It is suggested that it be replaced when required. There is one mop sink located in the custodian's closet on the ground floor. It appeared to be in poor condition, and it is suggested that it be replaced.

The lifespan of plumbing infrastructure is generally 30 years, and if the plumbing is original to the building, it is assumed to be at or well past its service life.

6.2.8 Ductwork

Very little of the ductwork was observable at the time of the site visit, however the useful life of the ductwork is 50 years. If original or nearly original to the building, it is assumed that this ductwork is at the end of its serviceable lifespan.

6.2.9 Heaters

There are four propane radiant tube heaters located in the rink area of the building. The heaters and their reflecting shields are in poor condition and their replacement is recommended.

There is one Ouellet electric heater located in the Zamboni room. The age of the unit could not be determined at the time of visit, though it appears to be in good condition with no corrosion or dirt visible.

There is one electric heater located in the referee room on the ground floor. The brand and age of the heater could not be determined at the time of the visit. However, it is rusted and appears to be passed its service life and should be replaced.

There is one 600V, 10kW Westcan electric heater located in the ammonia room. It was installed in 1988 and appears to be in poor condition. The useful life of a radiant heater is approximately 18 years. The heater has surpassed its useful life and should be replaced.

There is one electric baseboard heater located in the VIP viewing box in the Arena. The brand and age of the heater could not be determined at the time of the visit.

6.3 Fire Protection Systems

6.3.1 Fire Extinguishers

The building is equipped with wall mounted portable fire extinguishers that are observed to be in good condition. The extinguishes appear to not be regularly maintained, with the last inspection done in October of 2020 for some of them. It is recommended to ensure that all portable fire extinguishers are inspected monthly and to replace the extinguishers as directed by the inspectors.

6.3.2 Sprinkler Systems

A single-zone dry-pipe sprinkler system serves the entire building. The valves and compressor in the mechanical room appear to be in fair condition, and updated tags indicate that the system is tested regularly. 96 of the sprinkler heads were replaced the week of August 5th. At the time of the visit, a hissing noise was audible at several of the capped and valved ends of various branches of the sprinkler system. This is presumed to be related to the recent/ongoing sprinkler head replacement project.

The building is equipped with a sprinkler monitoring system (Paradox). The panel is installed in the water heater room at the main entrance vestibule along with a direct PSTN telephone line connecting to a remote constantly attended fire signa receiving center (GMS) through an auto-dialer. The OS&Y main valve on the dry sprinkler system is supervised with a tamper switch. The dry pipe system is also equipped with an air pressure switch to confirm water release. All these supervisory devices are connected to the sprinkler monitoring system (Paradox panel).

6.4 Fuel Tanks

Oil is stored in one location and propane is stored in three locations around the outside of the building. All nine tanks appear to be in fair to poor condition, with scratches and rust visible. It is unknown whether these tanks are owned or rented.

One Superior Propane branded 1000-gallon tank was installed between the Arena and the adjacent building in 1980 serves the radiant tube heaters (west side stands), the silica gel dehumidifier, and the Zamboni's domestic hot water heater.

Four Superior Propane branded 375-liter tanks are located at the side of the building and serve the radiant tube heaters (east side stands), and the Rheem furnace.

Two Superior Propane branded 375-liter tanks and one Budget branded 375-liter tank are located at the front of the building and serve the canteen and the domestic hot water tank in the mechanical room near the front entrance of the building.

Oil is stored in one Clemmer LS branded 581-gallon (2200L) tank installed between the arena and the adjacent building in 2005. It serves the Jackson & Church furnace.

7.0 Electrical Assessment

A visual review of the interior and exterior of the Shawville Arena was performed on August 16, 2024. The investigation was limited to what was visually accessible. Ceiling tiles were not displaced; therefore, spaces above suspended ceilings were not reviewed. A limited description of the building was provided by the electrical technician subcontracted by the municiplity, which generally forms the understanding of the overall electrical systems. The review was non-intrusive except for the few electrical enclosures (disconnects, panels, etc.,) where the Arena's electrical technician was able to provide access for JLR's visual review. No record drawings of the existing building were made available to JLR.

7.1 Service Entrance Feeders

The main electrical service entrance consists of three pole-mounted single phase transformers managed by Hydro Quebec feeding two separate service entrance feeders (400A, 600V each) located in the ice rink equipment room.

A third service entrance feeder rated 600A at 120/240V is located on the second floor of the Arena building. It was not clear where the 120/240V incoming feeder is originating from.

The first service entrance feeder located in the ice rink equipment room feeds into a 400A, 3P 600V main disconnect switch and metering cabinet. The feeder splits to supply the rink lighting panel, a unit heater in the ice rink equipment room, a feed for a Bell mobility transformer through wall mounted disconnect switches and a 200A splitter. The second splitter feeds two propane powered dehumidifiers as well as a legacy phase indicator panel.

The second service entrance feeder located in the ice rink equipment room feeds into a 400A, 3P 600V main disconnect switch and metering cabinet. The feeder splits to supply the barn, dance hall, west steel building and the rink building through wall mounted disconnect switches.

The third service entrance feeder located on the second floor of the arena building feeds into a 120/240V, 600A, 3P main disconnect switch and metering cabinet. The feeder splits to supply the following panels: Panel A, Panel B at ground floor arena, outdoor flood lights, 100A arena QOB panel, 1st floor panel and a 400A, 3P disconnect feeding power for the annual Expo Shawville fair.

Majority of the electrical equipment appears to be legacy and has exceeded their average useful life. Rust has been noticed on major electrical enclosures within the arena.

During our site review, we have noticed a deficiency in the wiring termination at the 200A, 3P disconnect of the secondary splitter in the ice rink equipment room. We have also noticed mismatching fuse brand and ratings within the same disconnect switch which is hazardous.

7.2 Electrical Distribution

Panel A (120/240V, 200A, 3P, 4W) - General Electric Load Center 24 ways equipped with Siemens breakers. It has exceeded its average useful life. Signs of rust on the panel enclosure was noticed.

Panel B (120/240V, 200A, 3P, 4W) - General Electric Load Center 24 ways equipped with Siemens breakers. It has exceeded its average useful life. Signs of rust on the panel enclosure was noticed.

Panel 213 (347/600V, 100A, 3P, 4W) – Commander CGL-2 24 ways equipped with Eaton circuit breakers. The panel is 25 years old and has had its cover door removed. It has exceeded its average useful life.

Q0 Load Center (120/240V, 200A, 3P, 4W) – Square D load center 30 ways equipped with Square D breakers.

Siemens EQ load center. No information on rating and/or schedule.

Square D QO Load Center (120/240V, 100A, 2P) installed in storage area near Zamboni parking.

Siemens EQ Load Center (120/240V, 200A, 3P, 4W) installed at second floor Lions Hall electrical room.

Disconnect switches: Square D, 600V, fusible. Switches have reached their average useful life and should be replaced. Fuses within the disconnect switches should be replaced with new of same make, class and rating.

Control panel for Ice Rink Equipment (brine pump, water pump, evap fan, compressors). Starters are across the line for 50HP compressors and for 20HP pumps that will create high starting currents during start-up affecting the power system within the arena.

7.3 Wiring and Conduits

During our site review, we have noticed the following types of wiring:

- BX cables used for wiring receptacles, switches, lighting, door controllers,
- Flexible cords for connection of mechanical equipment such as compressor, TV, emergency battery units, etc.
- TEW wires without conduits for connecting fire alarm bells, sprinkler supervisory devices and loudspeakers
- Romex cable for wiring water heaters.
- EMT conduits with RW90 wiring for sprinkler monitoring panel, fire alarm manual pull stations, fire alarm end-of-line resistors,
- Metallic flexible conduit with RW90 wiring used for connecting humidifiers, ice rink compressors, pumps, etc.
- Bare copper ground connected to the main disconnect switch

Wiring observed in multiple locations do not comply with current electrical and building codes.

7.4 Lighting Fixtures

We have distinguished the following types of lighting fixtures in the building:

- 2x4 fluorescent recessed panels with frosted diffusers mainly used in changing rooms, entrance vestibule, and washrooms
- 1x4 surface mounted strip lights at the main reception
- Incandescent lamps on holder sockets in storage and technical rooms
- Spotlights in washrooms and shower areas
- High bay fluorescent lights with protective wire guard within the arena rink
- Industrial pendant lamp with incandescent bulb
- Wall packs for exterior perimeter lighting
- 2x4 fluorescent surface mounted panels with opal diffuser installed in kitchen at second floor.

Many of the 2x4 fluorescent recessed panels were found with damaged or broken diffusers.

Using incandescent bulbs on holder sockets risk overlamping and becomes a fire hazard.

120V downlight in shower areas may present a risk of electrocution and should be replaced if found to be non-compliant.

Some exterior wall packs were damaged which presents risk of water infiltration and short circuits.

7.5 Emergency Lighting and Exit Signs

The arena is equipped with emergency battery units (EBUs) with dual heads and exit signs throughout all the entrance and exit doors.

EBUs are Lumacell connected through a dual receptacle mounted adjacent to it.

Exit signs consist of lighted signs, reading SORTIE in six-inch LED red letters.

The system was not tested, and maintenance logs could notbe located.

7.6 Fire Alarm System

The Arena is not equipped with a dedicated fire alarm system. However, it seems that the fire alarm system installed in the adjacent building is serving the Arena with three zones: arena lobby, lions hall and arena. However, the fire alarm system is not supervising the fire protection systems installed at the Arena.

Fire alarm system was not tested during the visit and annual inspection reports were not available.

7.7 CO & Gas Detection

The Arena is equipped with the following CO detection systems:

- A local CO detector c/w siren and strobe at the main entrance
- A local CO detector at the kitchen on the second floor Lions Hall.
- Wall mounted Honeywell controllers and gas detectors for monitoring carbon monoxide (CO), nitrogen dioxide (NO2), hydrogen sulfide (H2S), oxygen (O2), methane (CH4), hydrogen (H2) and propane (C3H8) installed near Zamboni's parking and within the arena near the gas operated humidifiers.

7.8 Barrier Free Doors

The main entrance doors are equipped with automatic swing door operators (Ditec).

7.9 Other Systems

We have noted the presence of the following systems:

- Sound system consisting of loudspeakers and head-end equipment
- Scoreboard system

7.10 CCTV System

A CCTV system is installed since 2022 at the Arena. The head end is installed in the office at the arena's reception and CCTV cameras are installed at the main entrance vestibule and around the perimeter of the arena building.

8.0 Key Observations

8.1 Structural Key Observations

- Slab were observed to be in poor condition, with noted spalls, delaminations and cracks throughout. Particularly in the regions with noted water infiltration, the slab was severely deteriorated.

- Water infiltration at various locations was noted. Water observed to be pooling at steel column base plates causing rusting and deterioration.
- Multiple spalls of concrete block wall elements in interior rooms were observed.
- The observed grade on the western face of the structure was observed to be tight to the cladding causing buildup of water and flooding and has led to severe rusting and deterioration of the exterior cladding. The cladding in some locations is completely rusted causing significant section loss which has led to water infiltration inside the building.
- Altered cross brace observed in entrance structure dressing room raises concern. Cross braces are meant to support the lateral system of the structure and should not be altered. Some sections of lateral braces were not available for review due to unmovable obstructions.

8.2 Architectural Key Observations

- Exterior building wall envelope was observed to be in poor condition, with noted large openings, damaged and corroded areas
- Exterior building wall envelope thermal performance was observed to be poor with the bottom section under the bleachers were un-insulated.
- Washroom facilities within the dressing rooms and referee room was observed to be in poor condition and limited space.
- Accessibility within the existing facility for circulation and to access to the second-floor banquet hall, the bleacher area, the ice surface and the washroom facilities within the dressing rooms was observed to be non conforming to barrier-free design requirements of current codes.

8.3 Civil Key Observations

- Noted that internal floor drains are in some cases connected to the storm sewer system.
- Perforated pipe systems were installed in relatively long runs that form the minor system on site, some of which pass under existing structures (i.e., barns) could have future maintenance impacts, and potentially have limited functionality during spring thaw.
- Noted drainage issues in the rear of the Arena, adjacent to mechanical chiller manifold vault and (potentially) septic tank system.
- Unknown quantity of stormwater is received from outside of the property (adjacent properties and ROW).
- Visual review the field adjacent to the field forms a major low point.
- An assessment of the adequacy of the existing storm servicing should be completed.
- Shallow domestic services with many Tees pose potential for freezing. It was noted there is historical potential for freezing water services under existing rink to referee rooms.
- Water service of unknown age passes beneath the existing octagon building, limiting opportunity to repair if needed.
- Domestic water service for all buildings connection to existing 6” fire supply should be reviewed against Construction Code to verify requirements.
- Secondary Hydrant service from Rue Clarendon is long with minimal servicing and could create a stagnant water supply for the existing 4H building.
- Poor quality or hazardous materials were reported in the sanitary system (i.e., bituminous fibre pipe, asbestos concrete pipe).

- Tee connections for Sanitary were noted (i.e., junctions not at a maintenance hole) and typically create potential for clogs & freezing with limited ability to correct.
- Existing Sanitary septic system of unknown age and functionality partially services the Arena.

8.4 Electrical Key Observations

- Wiring termination at the 200A, 3P disconnect in the ice rink equipment room is loose and requires immediate intervention (risk of ground faults and fire incidents).
- All fuses within the disconnect switches shall be replaced as soon as possible with new of same make, class and rating.
- Investigate and replace if required all lighting fixtures in shower and other wet areas.
- Replace all broken diffusers on light fittings (indoor and outdoors) – risk of electrocution and other hazards.
- Review fire alarm system in its entirety; remedial works are likely to include the following:
    - Connect the sprinkler supervisory modules to the fire alarm system. Connect the auto-dialer to the fire alarm system.
    - Provide new supervisory modules in the kitchen suppression systems.
    - Maitain annual test reports for the fire alarm system
    - Battery fault on exiting fire alarm system to be rectified immediately.
- Connection to the water heaters to be retrofitted. Consider ground fault interruption.
- Replace all lamp holders with industrial weatherproof light fittings.
- Replace all electrical components (light switches, light fittings, receptacles, etc.) adjacent to wet areas with weatherproof devices or relocate.
- Provide ground bar in equipment room and ensure equipotential bonding.
- Lightning protection and surge protection requirements should be reviewed.
- Maintain annual and monthly test reports for the exit and emergency lighting systems.

8.5 Mechanical Key Observations

- The chiller system which creates and maintains the ice surface is comprised of equipment of various age, condition, and lifespan, with motors, a pump, and piping due for replacement.
- The radiant propane heaters serving the stands and the furnace serving the lobby are also at the end of their service life.
- The dehumidification system (as noted by the building operator) has difficulty keeping up with the first few months of the ice-making season.
- At least four of the six domestic hot water tanks located around the building have reached the end of their service lives.
- Commercial kitchen hoods certification and inspection could not be verified, and some fire-hazard items were noted related to the kitchen exhaust hoods.
- Approximately half of the mechanical equipment appears to be in need of replacing urgently (or within the next five years). It appears the ventilation in the building is not code compliant. We recommend major overhaul of mechanical systems in the building.

9.0 Conclusion and Recommendation

This report has been prepared for the Town of Shawville to provide a multi-disciplinary review of the existing Shawville Arena structure. Due to the lack of available documents, it was proposed that JLR send a member from each discipline (Structural, Architectural, Civil, Mechanical and Electrical) to site to provide a high-level building condition assessment to better understand the structure, surrounding environment, and equipment within the building. Each discipline conducted a visual review of the structure, documenting key observations of the systems.

During our site review we have noticed deterioration and poor or missing thermal insulation with the exterior envelope as well the relatively poor condition of the washrooms and kitchens. Barrier-free access to the washrooms, changerooms, second floor and most public areas of the Arena is not provided. Based on the preceding observations, we would recommend that a short-term renovation project should prioritize the following:

- Replacement of exterior cladding, doors, and windows.
- Replacement and upgrade of thermal insulation within the exterior envelope.
- Complete refurbishment of washrooms, changerooms, and kitchens.
- Provision of barrier-free access to key areas of the building (if and where feasible) by adding ramps, elevators, or lifts.

In the case that the feasibility and cost of a proposed major renovation should need to be compared with the feasibility and cost of constructing a brand-new facility, we would recommend the following be undertaken:

- Designated substances survey of the entire Arena.
- Intrusive openings within exterior walls and roof to determine their current thermal performance and gain a detailed understanding of the condition of the wall and roof assemblies.
- Point cloud scanning of the building with the intent of producing record drawings.
- Detailed code review of the building.

From a mechanical perspective, some items have been identified for immediate action. As discussed, the commercial kitchen hoods certification and inspection could not be verified, and some fire-hazard items were noted related to the kitchen exhaust hoods. Items indicating potential fire hazards should be rectified immediately. From an electrical perspective, deficiencies in the wiring terminations at the 200A, 3P disconnect in the ice rink equipment room were noted. Multiple fuse mismatching within a single disconnect was also noted. These deficiencies should be investigated further and rectified with immediate effect. All feeders and conduit appear to be in good condition with organized and neat runs. The wiring appears to be from the original construction of the building but does not show signs of excessive wear. In certain locations where conduit runs appeared untidy or in dangerous locations such as on the floor in wet or damp locations, conduit runs should be revised to mitigate risk.

Following the limited BCA, the next steps for a potential renovation of the Arena are to create as-built base plans and subsequently write the feasibility report. The base plan will assist in mapping the areas in need of renovation. The intent of the feasibility report will be to discuss the

feasibility of renovations and the methodology for each element in need of renovation. The report will aid greatly in decision-making for the future of the Arena.

As there is a fair amount of missing information for the structure and site, it is recommended that the following investigations be performed to aid in the overall understanding of the structure and the reliability of the feasibility report:

- A foundation investigation alongside a geotechnical investigation.
- Topographic survey of the surrounding site and Arena.
- In-depth investigation of building humidity control requirements.
- Electrical – enhance the as-constructed electrical drawings (layouts, diagrams, risers, etc.) with the help of the electrician.

The topographic survey shall be useful for the Town's record as well as aid in the full assessment of the stormwater distribution network. Inverts, slopes and locations will help better understand the surrounding network. It was discussed with the building operator that the space does not dehumidify well the first months the ice is instated which results in poor quality ice. An in-depth investigation would provide a better understanding of the building humidity control requirements and aid in providing recommendations.

It should be noted that performing the listed investigations prior to the feasibility report will reduce risk in the Arena recommendations and assessment as more information will be made available. The overall reliability of the feasibility report shall increase with more knowledge of the site and structure.

Based on the noted electrical system items, we recommend moving forward with the Arena upgrade feasibility study which will include:

- A code review of the existing architecture and life safety systems.
- Multiple options proposal for repairing/upgrading/replacing existing systems at the Arena c/w high level scope of services, class D opinion of probable construction cost and schedule.

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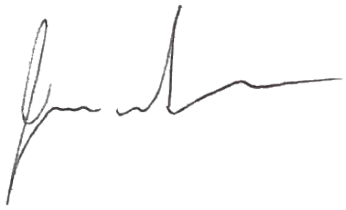

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Encl. APPENDIX A – Structural Photos
APPENDIX B – Architectural Photos
APPENDIX C – Civil Photos
APPENDIX D – Electrical Photos
APPENDIX E – Mechanical Photos
APPENDIX F – Preliminary As-Constructed Electrical Single Line Diagram

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Appendix A

Structural Photos

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Appendix A – Structural Photos

Photo 1: Front face of entrance structure.

Photo 2: East face of structure.

32824-000 – Shawville Feasibility Investigation
Appendix A – Structural Photos

Photo 3: West face of structure facing south.

Photo 4: West face of structure facing north.

Photo 5: Rear of arena.

Photo 6: Arena interior.

Photo 7: Tapered steel columns in arena.

Photo 8: Cross brace connection to steel roof beam at southeast end arena.

Photo 9: Steel roof beam.

Photo 10: Cross bracing at back wall of arena.

Photo 11: Opening observed at interior steel cladding wall.

Photo 12: Exposed base slab at Zamboni entrance.

Photo 13: Exposed base slab underneath west bleachers.

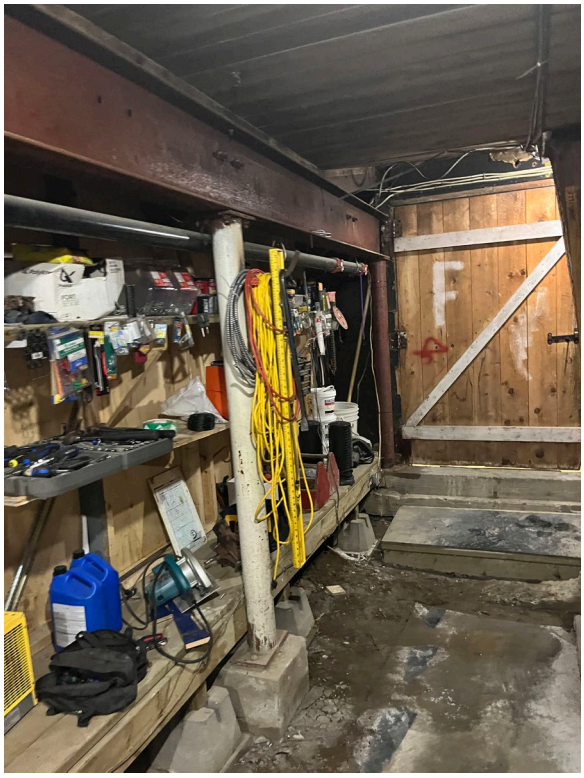


Photo 14: Exposed deteriorated base slab underneath west bleachers.

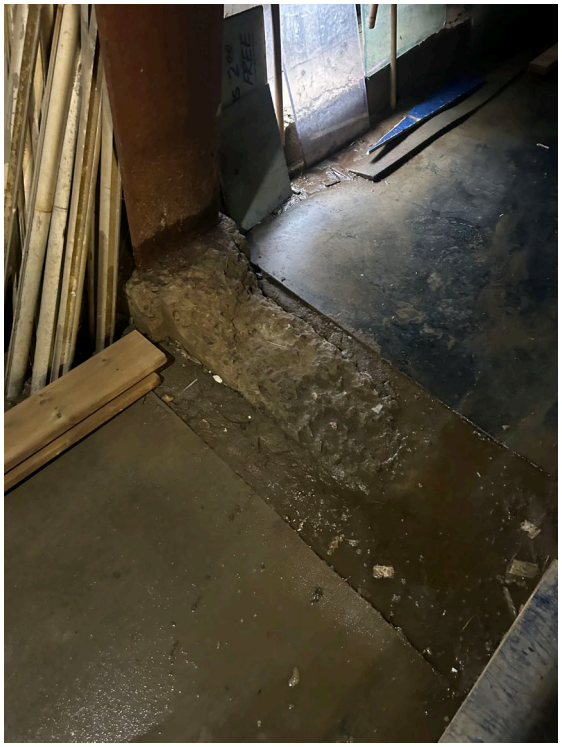


Photo 15: Exposed base slab underneath bleachers.

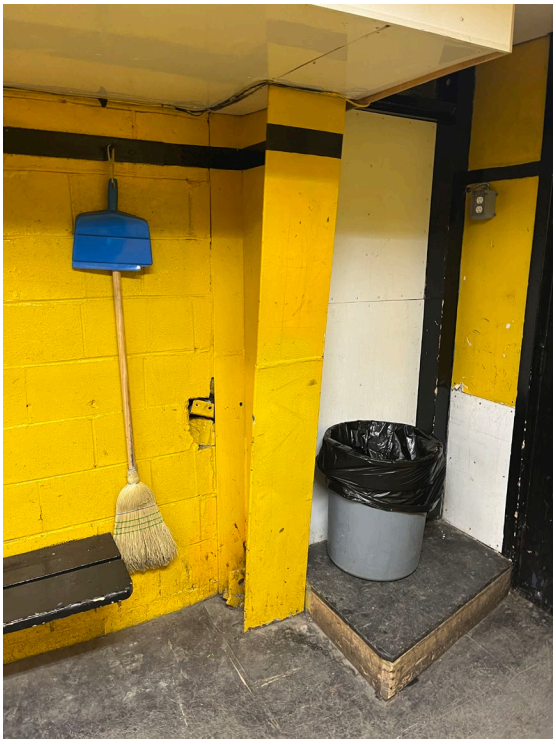


Photo 16: Exposed base slab underneath bleachers.

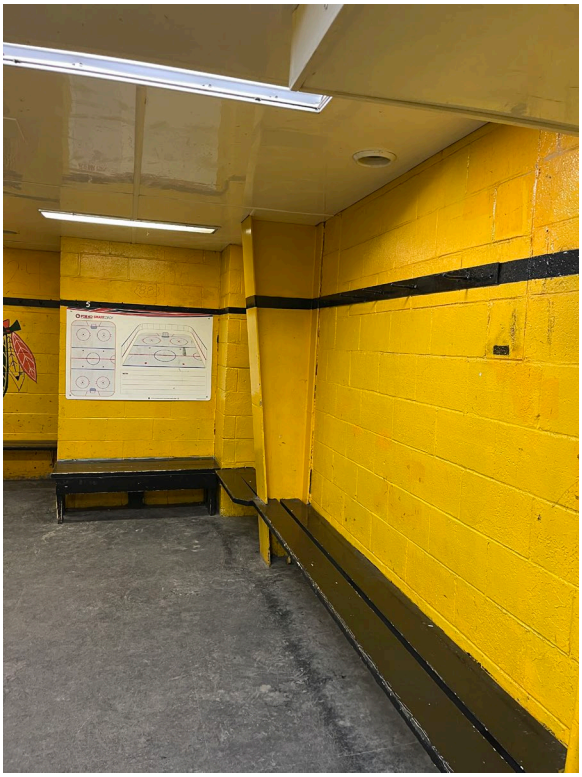


Photo 17: East side dressing room.

Photo 18: Cross bracing at east side dressing room.

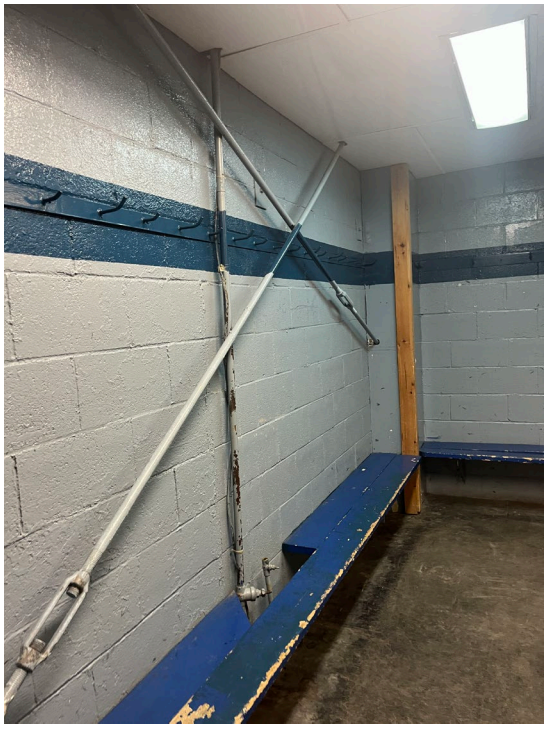


Photo 19: Interior column at east side dressing room.

Photo 20: Interior column at entrance structure office.

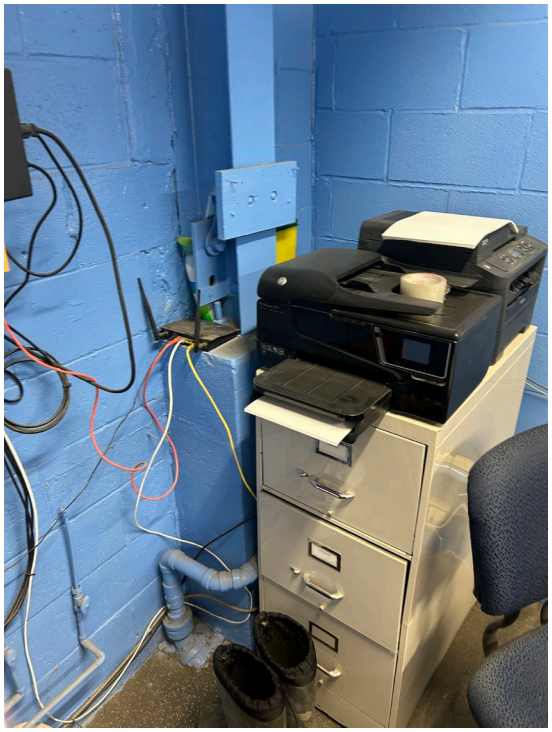


Photo 21: Cross bracing observed to go through concrete block wall.

Photo 22: Cross bracing observed to go through concrete block wall.

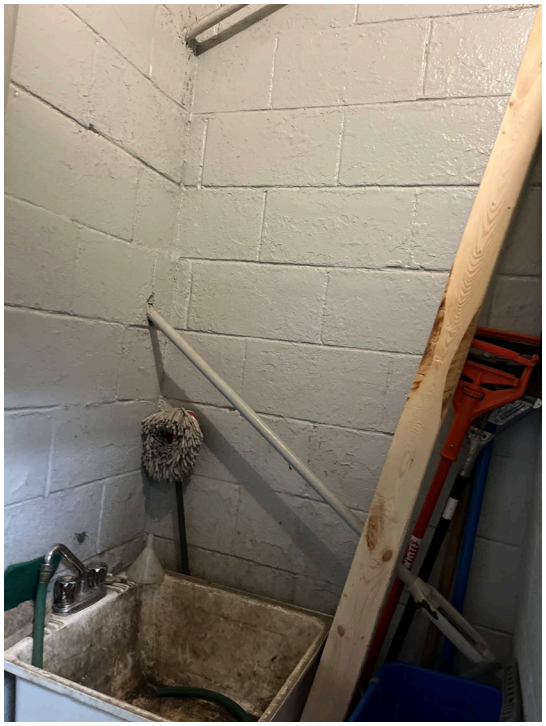


Photo 23: Wood beam elements under mezzanine.

Appendix B

Architectural Photos

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 1: Overview of arena entrance.

Photo 2: Section loss at exterior cladding seen from inside the structure.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

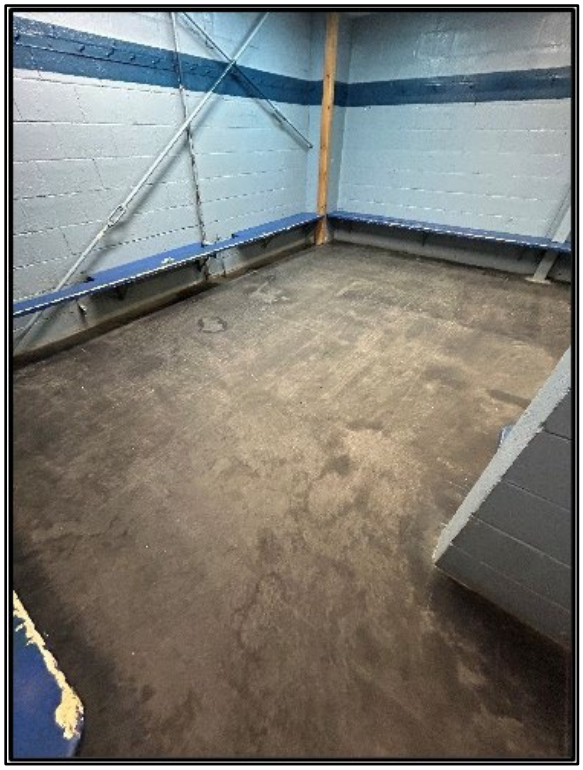
Photo 3: Deformed exterior cladding on east side of rink structure.

Photo 4: Exterior cladding with visible rusting.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 5: Lobby area facing west.

Photo 6: Dressing room located east of lobby.



32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 7: Dressing room located west of lobby.

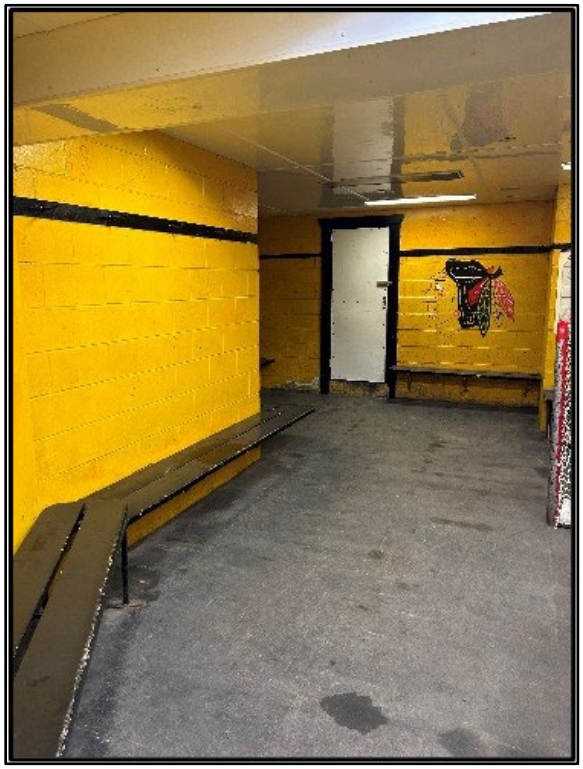


Photo 8: North end of arena.

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Appendix B – Architectural Photos

Photo 9: Northwest end of arena.

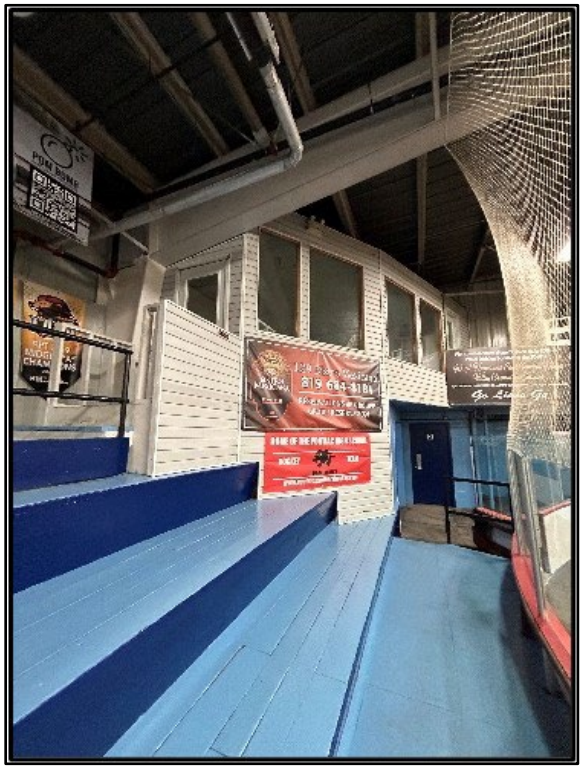

Photo 10: Underneath wooden bleachers.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 11: Washroom within dressing room on southeast side of lobby.

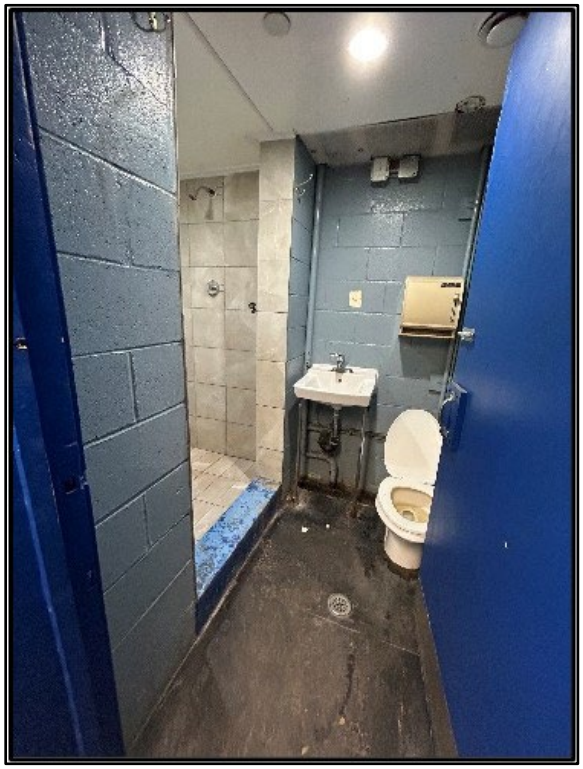

Photo 12: Kitchen at second floor community space.

Photo 13: Second floor community space.

Photo 14: Second floor deck underside.

32824-000 – Shawville Feasibility Investigation
Appendix B – Architectural Photos

Photo 15: Northeast end of arena.

Photo 16: Underside of roof panels.

Appendix C

Civil Photos

32824-000 – Shawville Arena Feasibility Investigation
Appendix C- Civil Photos

Photo 1: Front entrance manhole interior (closest to arena).

Photo 2: Front entrance parking lot manhole interior.

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Appendix C- Civil Photos

Photo 3: Wide shot of front entrance manholes.

Photo 4: Manhole at west side of arena.

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Appendix C- Civil Photos

Photo 5: Manhole at west side of structure.

Photo 6: East field manhole.

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Appendix C- Civil Photos

Photo 7: East field manhole interior.

Photo 8:Manhole west of arena.

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Appendix C- Civil Photos

Photo 9: Manhole west of arena.

Appendix D

Mechanical Photos

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Appendix D – Mechanical Photos

Photo 1: AC Unit 1

Photo 2: AC Unit 2

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Appendix D – Mechanical Photos

Photo 3: AO Smith Motor

Photo 4: Brine of Glycol Circulation Pipes

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Appendix D – Mechanical Photos

Photo 5: Chiller

Photo 6: Glycol Circulation Pump

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Appendix D – Mechanical Photos

Photo 7: Compressor Units

Photo 8: Cooling Tower

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Appendix D – Mechanical Photos

Photo 9: Large Dehumidifier

Photo 10: Small Dehumidifier

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Appendix D – Mechanical Photos

Photo 11: DHW Heater (Kitchen)

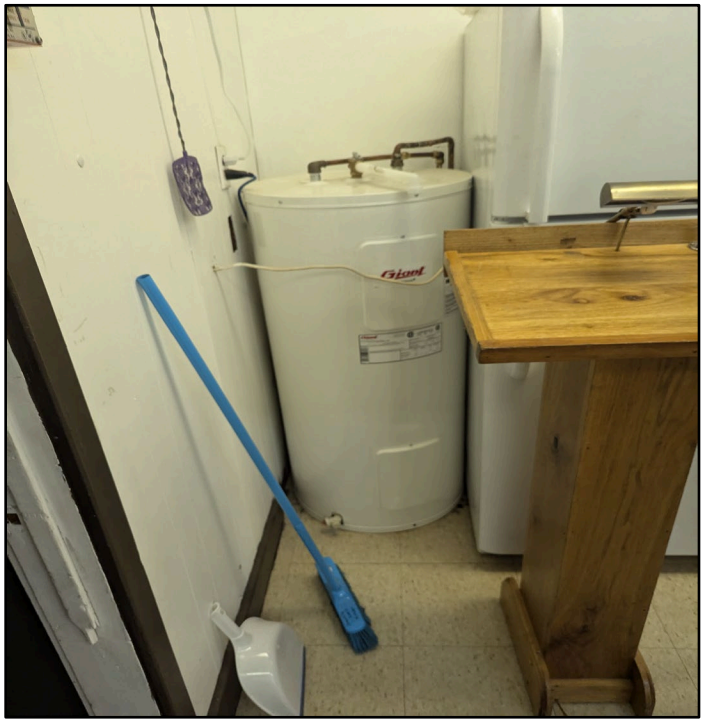

Photo 12: DHW Heater (Stairs)

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Appendix D – Mechanical Photos

Photo 13: DHW Heater (Zamboni Room)

Photo 14: DHW Heaters (Mechanical Room)

Photo 15: Exhaust Fan

Photo 16: Jackson and Church Furnace

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Appendix D – Mechanical Photos

Photo 17: Plumbing Fixtures

Photo 18: Radiant Heater - Ammonia

Photo 19: Radiant Heater - Furnace

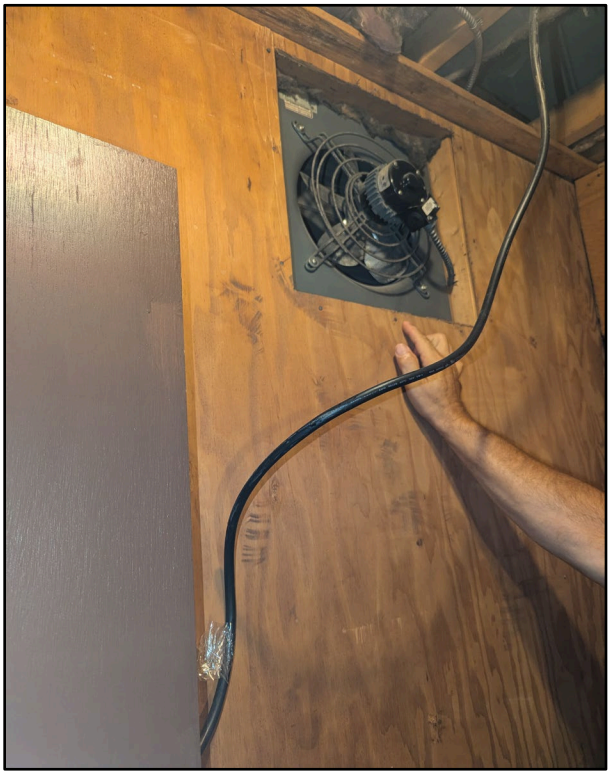

Photo 20: Radiant Heater – Referee Room

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Appendix D – Mechanical Photos

Photo 21: Radiant Heater – Zamboni Room

Photo 22: Radiant Heater – Zamboni Room

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Appendix D – Mechanical Photos

Photo 23: Radiant Heater – Furnace 1

Photo 24: Radiant Heater – Furnace 2

Photo 25: Separator 1

Photo 26: Separator 2

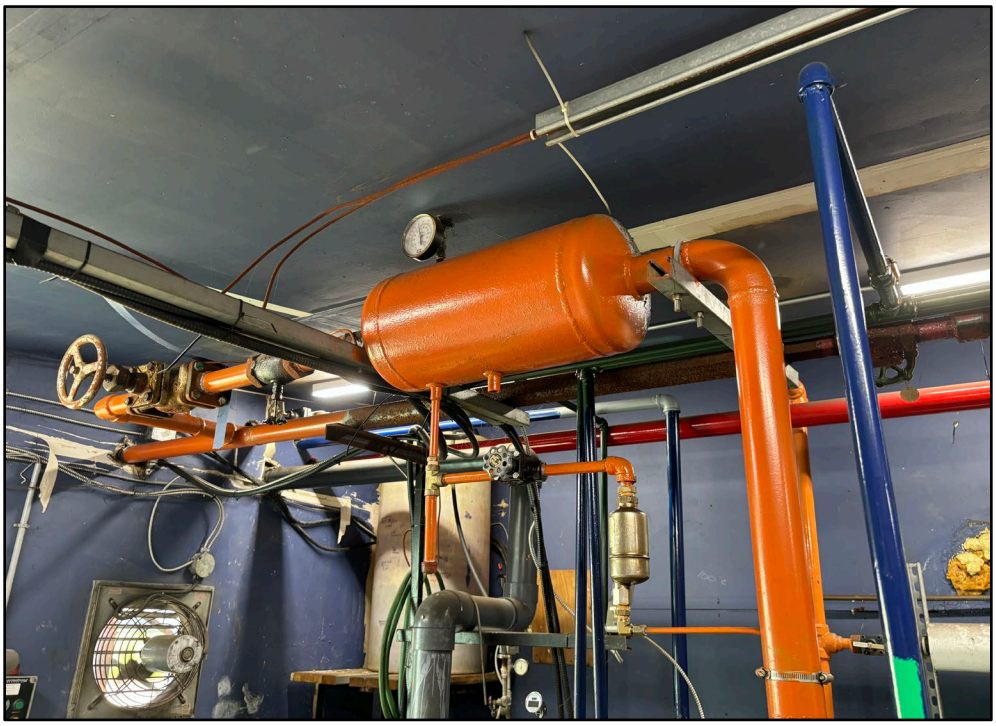

Photo 27: Sprinkler System

Photo 28: Tube Radiant Heater

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Appendix D – Mechanical Photos

Photo 29: Zamboni Room Water Entry

Photo 30: Water Tank

Appendix E

Electrical Photos

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Appendix E – Electrical Photos

Photo 1:Pole Mounted Transformers

Photo 2: Service Entrance

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Appendix E – Electrical Photos

Photo 3: 400A, 600V Disconnect

Photo 4: 400A, 600V Disconnect

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Appendix E – Electrical Photos

Photo 5: Panelboard Rust

Photo 6: Panelboard Rust

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Appendix E – Electrical Photos

Photo 7: Equipment Rust

Photo 8: Disconnect Rust

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Appendix E – Electrical Photos

Photo 9: Wire Termination Issues

Photo 10: Non-Matching Fuses

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Appendix E – Electrical Photos

Photo 11: More Non-Matching Fuses

Photo 12: Wiring Issues

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Appendix E – Electrical Photos

Photo 13: Conduit Runs

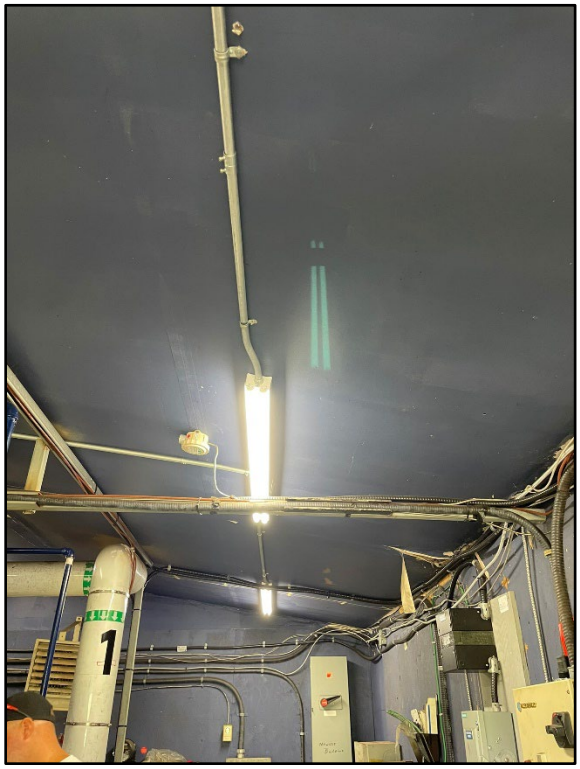

Photo 14: Damaged Lighting Fixtures

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Appendix E – Electrical Photos

Photo 15: Lighting Fixture in Shower

Photo 16: Outdoor Wall Pack

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Appendix E – Electrical Photos

Photo 17: Damaged Wall Pack

Photo 18: Exit Signage

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Appendix E – Electrical Photos

Photo 19: EBU

Photo 20: Dry-Type Sprinkler System

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Appendix E – Electrical Photos

Photo 21: Fire Alarm Bell

Photo 22: Carbon Monoxide Detector

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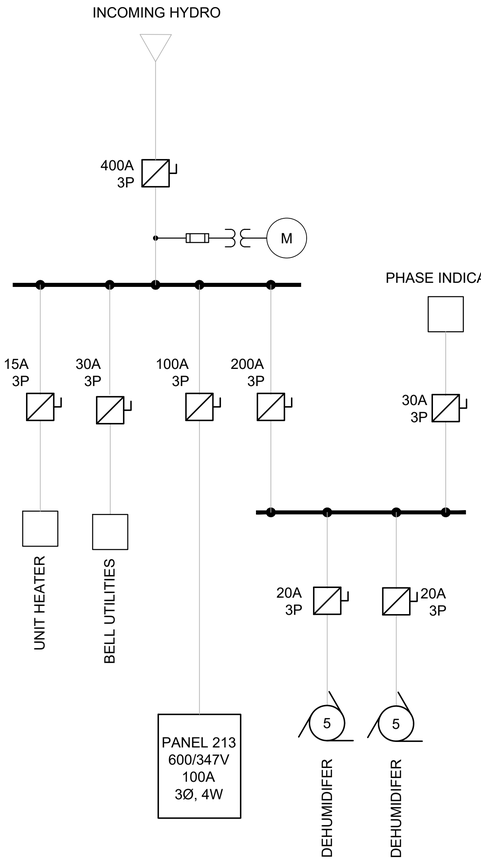
Appendix E – Electrical Photos

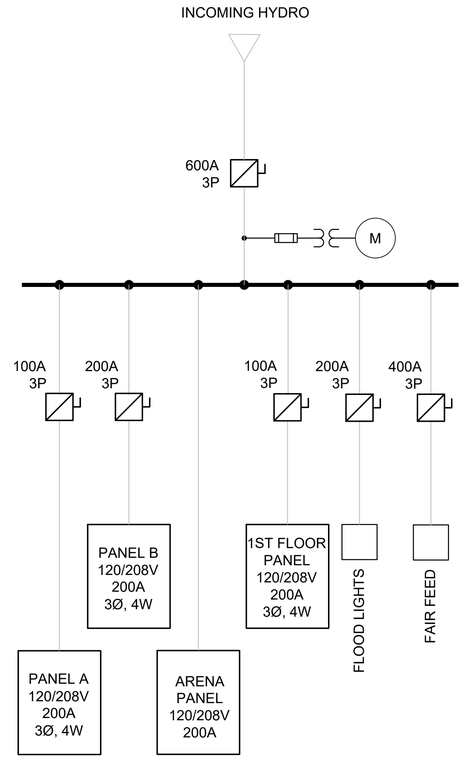
Photo 23: Security Camera

Appendix F

Preliminary As-Constructed
Electrical Single Line Diagram



01 E100 ARENA FIRST FEEDER
N.T.S.



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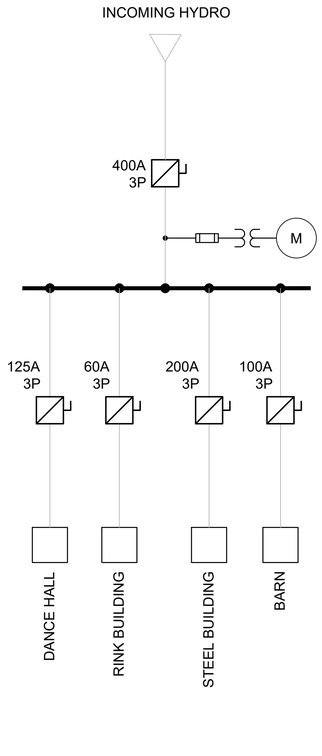

03 E100 FIRST FLOOR LIONS HALL FEEDER
N.T.S.

LEGEND

	FUSED DISCONNECT SWITCH
	ELECTRICAL PANEL
	ELECTRICAL SPLITTER
M	METERING EQUIPMENT
HP	MOTOR CONNECTION

AS CONSTRUCTED INFORMATION

THIS DRAWING COMPRISES THE ORIGINAL DESIGN DRAWING UPDATED TO REFLECT CONTRACTOR SUPPLIED INFORMATION AS TO FINAL "AS CONSTRUCTED" CONDITIONS. THE CONTRACTOR SUPPLIED INFORMATION HAS NOT BEEN VERIFIED AND, AS SUCH, THIS DRAWING IS NOT WARRANTED BY J.L.RICHARDS & ASSOCIATES LIMITED FOR COMPLETENESS OR ACCURACY.

DATE OF ISSUE: 2024-09-16

No.	ISSUE / REVISION	DD/MM/YY
1	PRELIMINARY AS CONSTRUCTED SINGLE LINE	2024-09-16

VERIFY SHEET SIZE AND SCALES. THE BAR TO THE RIGHT IS 25MM IF THIS IS A FULL SIZE DRAWING. 0 25mm

SCALE: N.T.S.

CLIENT:

CONSULTANT: www.jlrichards.ca

J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

CONSULTANT:

PROFESSIONAL STAMP

PROJECT NORTH

PROJECT:

SHAWVILLE ARENA
FEASIBILITY INVESTIGATION

DRAWING:

ELECTRICAL

SINGLE LINE DIAGRAM

DESIGN: T.MATAR	
DRAWN: K.HAMILTON	DRAWING #: E100
CHECKED:	
JLR #: 32824-000	

PLOT DATE: September 16, 2024 11:32:02 AM

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